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Initialed abstracts and reviews, not by Bureau staff, are by A. M. Massee, H. B. S. Montgomery and S. C. Pearce of the East Malling Research Station and by staff of the Obstbauversuchsring, Jork, Germany [O.J.].

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MISCELLANEOUS.

General.

1694. WENT, F. W.

The Earhart Plant Research Laboratory.

Pre-reprint *Chron. Bot.*, Vol. 12, No. 2, 1949, pp. 19.

In this bulletin the designer and director of the new laboratory of the California Institute of Technology, Pasadena, gives details of the construction of this latest, largest and most comprehensive greenhouse. In it it will be possible to grow plants under every possible climatic condition, since light, temperature, humidity, gas content of air, wind, rain or fog will be independently controllable. How this will be achieved is set out with plans and explanations. Notes are given of the control of air conditioning, maintenance of sterility—the number of visitors will have to be very small—, maintenance of temperature and humidity, control of special climatic factors; photographic equipment, the cultivation of the plants, artificial light sources, recording of data, etc.

1695. WALLACE, T.

Long Ashton research station.

Agriculture, 1949, 56: 170-8.

A brief picture of the station's chief activities, which concern fruit-growing, cider and fruit juice production, pests and diseases, plant nutrition and willow culture.

1696. HUDSON, J. P.

Horticultural education survey.

Fruitgrower, 1949, 107: 684-7.

A concise survey of the institutions in Great Britain where a training in horticulture may be obtained, and of the courses available to students.

1697. MINISTRIES OF AGRICULTURE, ENGLAND AND NORTHERN IRELAND, AND DEPARTMENT OF AGRICULTURE, SCOTLAND.

Agricultural Statistics, 1945, United Kingdom, Pt. I.

H.M. Stationery Office, Lond., 1948, pp. 31, 9d.

Includes figures showing the production of various fruits for the years 1935-44.

1698. MINISTRY OF AGRICULTURE, LONDON.

Agricultural Statistics, 1940-1944, England and Wales, Pt. II.

H.M. Stationery Office, Lond., 1948, pp. 117, 2s.

This, a companion volume to Part I, published in 1947, deals with prices of agricultural and horticultural products, whereas Part I dealt with acreages and production.

1699. TALLARICO, G.

L'ortofrutticoltura italiana. (The importance of Italian horticulture.)

Ital. agric., 1949, 86: 204-12.

The author describes, not the practice of horticulture, but its importance to national health, stressing the climatic factors which add to the value of Italian products when compared with those of more inclement lands.

1700. BURGOS, J. J.

La estacion agrometeorologica. (The agrometeorological station.)

(Publ.) *Minist. Agric. Nac., Argentina*, 1949 ?, pp. 15, reprinted from *IDIA*, Nos. 14-15.

A survey of the origin and development of agrometeorological stations in general. In particular the work of the stations at Poona in India, Berlin-Dahlem and of those in Argentina is discussed.

1701. CRUSE, R. R.

A chemurgic survey of the desert flora in the American southwest.

Econ. Bot., 1949, 3: 111-31, bibl. 67, illus.

Although commercial utilization of the desert flora in the American South-west and in northern Mexico is not considered immediately feasible, except in a few cases, there are shown to be possibilities of obtaining alcohol, paper pulp, sugars, starches, resins, gums, alkaloids and oils from plants of this region, if the economic situation should justify their extraction. It is suggested that the exploitation of cactus alkaloids, that have valuable pharmacological properties and might be used in the production of anti-malarials, and the cultivation of *Yucca* for fibre, offer outstanding possibilities for development.—Battelle Memorial Institute, Columbus, Ohio.

1702. CIFERRI, R.

Flora e vegetazione delle isole italiane dell'Egeo. (Flora and vegetation of the Italian islands of the Aegean.)

Suppl. Atti Ist. bot. Pavia, 1944, Ser. 5, Vol. A, pp. 199 (mimeo.), 200 L. it. [received 1949].

Short notes of the position in the different islands are followed by lists of plants, which include gymnosperms and fungi as well as phanerogams.

1703. ANON.

American altitude tests.

Fruitgrower, 1949, 107: 364.

In altitude tests on 34 fruits and vegetables carried out by the Lockheed Aircraft Corporation, California, no damage was observed up to altitudes of 30,000 ft. Control of temperature and humidity was found to be of great importance.

1704. HAMY, A.

Nouvelle méthode d'expérimentation au champ. (A new method of laying out field experiments.)

Ann. agron. Paris, 1949, 19: 271-6.

It is proposed to lay out experiments in long narrow plots side by side. Treatments would be applied to groups of adjacent plots, the results being graphed against the position of the plot in the field. In this way, treatment differences would be judged by the discontinuities of the graph. [As a means of laying out experiments, the method loses accuracy by depending on extrapolation. Also, treatments can be compared only in pairs. The method might well be useful with data from a field not designed as an experiment.]—Station agronomique de Châteauroux. S.C.P.

1705. GOIDANICH, G., AND CAMICI, L.
Ricerche sulla fisiologia della cicatrizzazione. (The physiology of wound healing.) [English summary $\frac{1}{2}$ p.]
Ann. Sper. agrar., 1949, 3: 383-90.

When potatoes were cut and agar cubes containing conidia of *Penicillium* incubated for 24 hours at 25° C. were placed on the cut surface a deepening of the phellogen was observed, whereas, if the fungus conidia were freshly sown, normal healing took place. Healing was also normal when agar cubes containing a filtered culture medium of *Penicillium* were similarly applied 24 hours after the surface of the potato had been cut, whereas deepening of the phellogen occurred when the same cubes were applied to the freshly cut surface. The implications of these observations are discussed. —*Staz. Pat. Veg. Rome.*

Nutrition.

(See also 1897-1901, 2134, 2302, 2326.)

1706. NOWATNY-MIECZYŃSKA, A.
Mikroelementy. (Microelements.) [English summary $\frac{1}{2}$ p.]
Przegląd Doświadczalnictwa rolniczego Poznań, 1947, 3: 200-20, bibl. 65.

A review of published work on trace elements in plant nutrition.

1707. BOTTINI, E.
I microelementi dei terreni agrari. (Microelements in agricultural soils. Boron.)
Ann. Sper. agrar., 1949, *Suppl.* Vol. 3, No. 2, pp. xiii-xl, bibl. 170.

A somewhat congested résumé of the findings of different workers mentioned in the bibliography, which does not, incidentally, contain titles.

1708. DEIJIS, W. B., AND FELDMEYER, J. H.
The micro-determination of cobalt in plant material.
Plant & Soil, 1949, 1: 359-71, bibl. 15.

The method adopted is based on the colorimetric determination of the cobalt-nitroso-*R*-salt complex.—*Wageningen.*

1709. HEWITT, E. J.
The relation of manganese and other metal toxicities to the iron status of plants.
Brit. Sci. News, 1949, 2: 116-19, bibl. 10, illus.

The evidence considered here shows that the problems of metal-induced iron deficiency are complex. Manganese is not unique in its ability to induce chlorosis, and may be much less active than several metals. The observation of simultaneous symptoms of iron and manganese deficiencies in the same plants implies some independent functions for these elements and this conclusion is supported by the visual distinction between manganese toxicity and induced iron deficiency. As the functional status of ferrous and ferric iron in chlorophyll formation is still not clear, the cause of induced iron deficiency symptoms cannot yet be specified in terms of this equilibrium. Hypotheses based on the relative oxidation-reduction potentials of the simple ions of the metals considered appear inadequate to explain their activity and more than one

mechanism may be involved. [Author's conclusion.]—*Long Ashton Research Station.*

1710. GERRETSEN, F. C.
Manganese in relation to photosynthesis.
1. Carbon dioxide assimilation and the typical symptoms of manganese deficiency of oats.

Plant & Soil, 1949, 1: 346-58, bibl. 15.

It has been proved that manganese deficiency results in a reduced carbon dioxide assimilation. Different symptoms of manganese deficiency of oats could be traced back to shortage of assimilates in the leaves. [From author's summary.]—*Agric. Exp. Stat., Groningen.*

1711. SHIRLEY, R. L., BENNE, E. J., AND MILLER, E. J.
Report on zinc in plants.
J. Ass. off. agric. Chem. Wash., 1949, 32: 276-80, bibl. 10, being *J. Art. Mich. agric. Exp. Stat.* 986 (n.s.).

The material for which data are presented includes leaves of lettuce and spinach. A simplification of the tentative A.O.A.C. method for zinc determination in plant tissue is suggested.

1712. TOBIAS, C. A., AND DUNN, R. W.
Analysis of microcomposition of biological tissue by means of induced radioactivity.
Science, 1949, 109: 109-13, bibl. 12.

Experiments are reported which indicate that microanalysis of tissue constituents by induced radioactivity may become a useful technique for the determination of ultramicro amounts of a number of elements. It is expected that the technique will play an important role, not only in tracer biochemistry but in plant nutrition and other sciences.

Rootgrowth.

(See also 1792.)

1713. ZIMMERMAN, P. W., AND HITCHCOCK, A. E.
The relation between age of stem tissue and the capacity to form roots.
Reprinted from *J. Gerontol.*, 1946, 1: 27-32, bibl. 6 [received 1949].

Although there is considerable variation among closely related species and varieties of plants, it is evident that there is a relation between the age of plant tissue and its natural capacity to form adventitious roots. This age factor can generally be overcome with the aid of hormone-like substances which serve as chemical growth regulators, and which have the power to induce adventitious roots on tissues where roots do not naturally appear. Cuttings of lilac taken in May can form adventitious roots. This capacity gradually declines until it is completely gone by July. Cuttings of apples taken early in May form roots when treated with growth substances, but the capacity diminishes and vanishes in June. Cuttings from seedlings of species hard to propagate are able to form roots, whereas cuttings from old trees of the same species can seldom be induced to root, even with the aid of hormone-like substances, because they no longer are able to make use of them. The mechanism in plants through which chemicals act is not understood, and it is further complicated because closely related species

differ widely in their response. The new use of plant hormones has thrown some light on the subject; but it is reasonably certain that the change in structure of protoplasm with age is a major controlling factor. [From authors' abstract.]

1714. GOEDEWAAGEN, M. A. J.

Het wortelstelsel der landbouwgewassen.

(Root development in agricultural plants.)

T.N.O.-Nieuws, 1948, 3: 9: 1-9, bibl. 5, illus.

The effect of nutrients, moisture, oxygen, water levels, soil structure and pH on the development and activity of plant roots is discussed in the light of the fundamental investigations being made at the Agricultural Experiment Station and Soil Science Institute, T.N.O. at Groningen. The increase in yields often obtained from the placement of fertilizers is considered to be due to the high salt concentration that encourages the formation of a mass of fibrous roots.

Growth substances.

(See also 1810, 1811, 1829-1831, 1835j, k, 1880, 2062-2088, 2089c, 2116, 2181, 2190, 2221-2227, 2399-2403, 2456, 2459, 2476, 2541, 2542, 2599, 2600, 2607, 2609, 2619.)

1715. MITCHEL, J. E., BURRIS, R. H., AND RIKER, A. J.

Inhibition of respiration in plant tissues by callus stimulating substances and related chemicals.

Amer. J. Bot., 1949, 36: 368-78, bibl. 45.

The effect of several plant growth substances was tested on the respiration of tissues of various plants, including carrot, bean, tobacco, tomato and sunflower. All active growth substances tested inhibited respiration, those having an aromatic ring and free carboxyl group being most effective. Compounds structurally similar but physiologically inactive, e.g. benzoic, salicylic and nicotinic acids, also inhibited respiration. The activity of these substances was greater at pH 5 than at higher pH levels.—University of Wisconsin, Madison.

1716. KELLY, S., AND AVERY, G. S., JR.

The effect of 2,4-dichlorophenoxyacetic acid and other physiologically active substances on respiration.

Amer. J. Bot., 1949, 36: 421-5, bibl. 19.

2,4-D is shown to have both stimulatory and inhibitory effects on the respiration of pea and oat tissues, depending on the concentrations employed. The range of concentrations causing stimulation are determined, and it is shown that oat tissue requires a concentration of 2,4-D at least 1,000 times stronger than does pea tissue to produce the same stimulation. A greater stimulation was observed in starved than in normal tissue. The effect of 2,4-D in the presence of substances that may act as intermediates in respiration (alcohol, malic, succinic and fumaric acids) is also reported, and its effect on respiration compared with that of dinitro-*o*-cresol and dinitro-*o*-cyclohexylphenol.—Vassar College, Poughkeepsie, N.Y.

1717. KRAMER, M., AND WENT, F. W.

The nature of the auxin in tomato stem tips.

Plant Physiol., 1949, 24: 207-21, bibl. 19, illus.

In an attempt to identify the auxin present in the growing tip of tomato plants, the diffusion coefficient of the auxin was determined. The molecular weight calculated from this was found to be close to that of indoleacetic acid, but significantly higher. Acid and alkali sensitivity determinations of the extracted auxin also corresponded with the behaviour of IAA. It is concluded that the auxin obtained from tomato stem tips is mainly 3-IAA with perhaps an admixture of a small amount of auxin of higher molecular weight.—California Institute of Technology, Pasadena.

1718. SNYDER, W. E.

Some responses of plants to 2,3,5-triiodobenzoic acid.

Plant Physiol., 1949, 24: 195-206, bibl. 5, illus.

Experiments were made at Cornell University to discover whether applications of TIBA, i.e. triiodobenzoic acid, affected the responses of plants to naturally-occurring and applied growth regulators. Inhibition of rooting in coleus cuttings and a stimulation of axillary bud development in red kidney bean and California privet was observed as a result of treatment with TIBA. Formative and injurious effects of TIBA treatment are described.

1719. THIMANN, K. V., AND BONNER, W. D., JR.

Experiments on the growth and inhibition of isolated plant parts. II. The action of several enzyme inhibitors on the growth of the *avena* coleoptile and on *pisum* internodes.

Amer. J. Bot., 1949, 36: 214-21, bibl. 16.

"The inhibition of growth by substances which are known to react with well-recognized enzyme systems provides an approach to the relation between growth and metabolism." A previous study of the action of iodoacetate and organic acids [see H.A., 18: 2375] showed that one of the enzymes controlling growth of the *Avena* coleoptile is probably of a sulfhydryl nature, and that the growth inhibition caused by the combination of iodoacetate with this enzyme is prevented by several organic acids, which promote growth when used alone. In order to obtain further evidence for the role of the sulfhydryl enzyme in growth, experiments reported in the present paper were undertaken with arsenite and some phenyl-mercury compounds, which are specific reagents for the sulfhydryl enzymes. Arsenite, parachloromercuribenzoate and phenyl-mercuric salts all inhibited growth, but the inhibition was not prevented or reversed by organic acids. The implications of the differences between inhibition caused by arsenite and iodoacetate are discussed. Parallel experiments carried out with etiolated pea stems showed that the reactions observed in *Avena* also occurred in dicotyledonous stems.

1720. BOOIJ, H. L., AND VELDSTRA, H.

Researches on plant growth regulators. XVI.

The effect of plant growth substances on coacervates. [Summary in English, French and German.]

Biochim. biophys. Acta, 1949, 3: 260-77, bibl. 19.

Coacervates are used as model systems for the protoplasmic membrane.

1721. HAVAS, L. J.

Parthenocarp and other hormone-mimetic actions induced by polyploidizing agents.*Bull. Fac. Hort. Budapest*, 1948, 12: 81-91, bibl. 38.

Parthenocarp has been induced in cucumbers, peas, tomatoes and corn by the use of the polyploidizing agents: ethyl mercury phosphate, colchicine and acenaphthene. It was found that this action was accompanied by hormonal syndromes, similar to those induced by plant hormones or by phytochemical and other polyploidogenic agents. It was concluded that the analogies of such responses, including aitinomic parthenocarp, to chemically unrelated substances was due to physical rather than to chemical actions on the mechanism which regulates the formation and translocation of endogenous phytohormones. [From author's summary.]

1722. MOEWUS, F.

Bestimmung des Wuchsstoff- und Hemmstoffgehaltes von Pflanzenextrakten. (The determination of the content of growth substances and growth-inhibiting substances in plant extracts.)*Züchter*, 1948, 19: 108-15, bibl. 22.

The roots of garden cress seedlings (*Lepidium sativum*) were shown to be an excellent material for growth substance tests. Apart from greater sensitivity they have the advantage over *Avena* coleoptiles that their manipulation is very much easier and that they do not involve the measurement of curvatures. Moreover, they register growth-inhibiting as well as growth-promoting effects. For the test the seeds are sown on filter paper in Petri dishes and left in an incubator at 27° C. for 18-20 hours. The seedlings used must have straight roots 5 mm. long. They must be removed from the dishes when the longest roots are 7-8 mm. to ensure that only vigorous ones are selected. The seedlings are placed on filter paper soaked with the experimental solution and kept in the dark for 17 hours at 27° C. The root growth is compared with the mean root growth of control plants. Statistical examination has shown that the standard deviation in determinations made at different times amounts to 0.65 mm., or 4%, as against a standard error of 30-100% in all other tests used hitherto. With the cress root test a deviation from the mean value of 0.7 mm. was found to be statistically significant. Results obtained with this method show, for instance, that a concentration of heteroauxin as low as one-millionth mg. in 1 c.c. water has a stimulating effect of 10%, while 10 mg. coumarin in 1 c.c. water are necessary to produce an inhibiting effect of 20%. Tables show the content of growth and growth-inhibiting substances in the following fruit juices at different concentrations: red, white and black currant, sweet and acid cherry, peach, raspberry and varieties of plum.—Kaiser Wilhelm Inst. f. medizinische Forschung, Heidelberg.

1723. MOEWUS, F.

Die Wirkung von Wuchs- und Hemmstoffen auf die Kresswurzel. (The effect of growth- and growth-inhibiting substances on cress roots.) [English summary 8 ll.] *Biol. Zbl.*, 1949, 68, 58-72, bibl. 20.

By means of the standard curve of effectiveness for

β -indolylacetic acid the action of a vegetable extract can be determined (e.g. on coleoptile-tips of *Avena*, leaves of melilot, rowan-berries of different ripeness). The inhibitory zone of the curve of effectiveness of a vegetable extract differs from that of the curve of effectiveness of heteroauxin. The differences are brought about by inhibiting agents contained in the vegetable extracts which can thus be determined quantitatively. There is a distinct antagonism between heteroauxin and coumarin. In the inhibitory zone of heteroauxin the two stunting effects are additive. Hydrated parasorbic acid and coumarin glycosides are growth promoters. [From author's English summary.]—Kaiser Wilhelm Inst. f. medizinische Forschung, Heidelberg.

Cultural problems.

1724. SECRETT, F. A.

The use and abuse of artificial irrigation on horticultural crops.*J. roy. hort. Soc.*, 1949, 74: 282-8, illus.

A report of a lecture given on 12 April, 1948. The way in which overhead irrigation may be used, not only to facilitate intensive cultivation, but for the application of fertilizers, trace elements and insecticides, is discussed. The problem of scorching caused by overhead irrigation with solutions can be largely overcome by the addition of oxygen to the water. Recent investigations suggest that the amount of water applied by this form of irrigation should be reduced, and the plants kept turgid by a light spraying at the end of the day. This would be of more benefit to the plants and the soil than heavy applications of cold water.

1725. BOUYOUCOS, G. J.

Nylon electrical resistance unit for continuous measurement of soil moisture in the field.*Soil Sci.*, 1949, 67: 319-29.

The nylon electrical resistance unit described, for determining soil moisture in the field, furnishes a very good method for measuring total soil moisture from saturation to almost air-dryness. The method should serve agronomists and plant physiologists, not only for measuring total soil moisture, but also for measuring available water content of soils. It should be used largely to supplement the plaster of Paris method, especially in very wet conditions where the gypsum block tends to disintegrate.

1726. DAWSON, R. C., DAWSON, V. T., AND McCALLA, T. M.

Distribution of microorganisms in the soil as affected by plowing and subtilling crop residues.*Res. Bull. Neb. agric. Exp. Stat.* 155, 1948, pp. 26, bibl. 10.

During the first nine months after application of crop residues, microbial populations were frequently associated with methods of handling the residues. The top inch of soil frequently contained greater numbers of micro-organisms where the residues were subtilled, while the 1-6 inch layer contained greater numbers where the residues were ploughed. The effect of residue management usually disappeared about nine months after application.

1727. EVANS, A. C.

Earthworms.

J. Bd Greenkeep. Res., 1947, 3: 49-54, bibl. 4.

A popular summary of the investigations in progress at Rothamsted Experimental Station on the effect of earthworms on soil fertility. These preliminary studies have been concerned mainly with fundamental questions such as the kind, number, life histories and habits of earthworms present in the soil. Of the three species that have been found feeding on the surface at night, two are those primarily responsible for casting (*Allobophora longa* and *A. nocturna*). This suggests the possibility of preventing casting without extermination of the whole worm population, by dusting the surface of the turf with a worm-killing agent at a sufficient concentration to kill surface feeding species, but which, when washed into the soil, will be diluted sufficiently to have little effect on the underground feeding species.

Machinery.

(See also 2025-2031, 2049, 2091, 2092, 2132, 2246, 2284, 2318n, 2319s, 2324, 2408, 2530, 2531, 2578.)

1728. ANON.

The coming evolution in orchard machinery.

Amer. Fruit Gr., 1948, 68: 12: 12-14.

A brief survey of interesting and promising new developments, with illustrations. They concern picking, spraying, hoeing and handling.

1729. MEEK, W. E., AND EWING, B. B.

Line-diagram method for the setting of farm implements.

Circ. Miss. agric. Exp. Stat. 138, 1948, pp. 9, illus.

Diagrams and explanatory notes illustrating this method of setting and adjusting row-crop implements. It is claimed that greater uniformity of spacing and depth of cultivation can be obtained by this method of checking the implement against a diagram on a concrete floor than by field adjustment.

1730. CAMUGLIA, G.

A simple fertilizer distributor for attachment to a tractor.

Proc. 16th Conf. Qd Soc. Sugar Cane Tech., 1949, pp. 129-31, bibl. 2, illus.

The author describes a modified form of the spreader originally described by him in 1947 [see *H.A.*, 18: 2192]. It is designed for attaching to the rear of a high-clearance tractor in such a way as to treat both sides of a row. It can also be used for applying gammexane; and it could probably be adapted for the inter-row sowing of legumes.

Propagation.

(See also 1786-1805, 1876.)

1731. LI, L.-Y., AND LI, C.-S.

Sphagnum moss as a convenient medium for germination of seeds and rooting of cuttings.

[Chinese, English summary 1 p.]

Fukien agric. J., 1948, 10: 15-20, bibl. 17.

Sphagnum moss was used successfully for routine germination tests and for the germination of difficult and precious exotic seeds. The moss gave good

results also as a rooting medium for cuttings of subtropical fruit trees.

1732. GERRETSSEN, F. C., MANTEN, A., AND MULLER, F. M.

Kunstmatische broeimeest uit stro. (Artificial hot-bed manure from straw.) [English summary $\frac{1}{2}$ p.]

Meded. Dir. Tuinb., 1949, 12: 140-9, and **Investigations concerning the preparation and application of substitutes for the present practice of using stable manure and cereal straw in the biological heating of hot beds.** *Plant & Soil*, 1949, 1: 240-63 (*Soils Fert.*, 1949, Vol. 12: Abstr. 903).

In searching for a substitute for stable manure in the preparation of hot-beds, field trials showed that cereal or caraway straw, plus urea in each case, was more economical than cereal straw plus a topdressing of stable manure.

1733. JOHN INNES HORTICULTURAL INSTITUTION (DARLINGTON, C. D., Editor).

Raising plants in soil blocks.

John Innes Leaflet 4, pp. 7, or *Coll. John Innes Leaflets*, 2nd edition, 1949, pp. 26-32.

The use of soil blocks instead of pots for raising plants has lately commended itself to the public on economic grounds. John Innes investigators have examined the *pros* and *cons* of the practice with special reference to their use for tomatoes and cauliflowers. The following notes are taken from their conclusions. They can be a satisfactory substitute for pots where planting out is done on the premises. Soil compression and superficial drying out are adverse factors with blocks, but these are fully, or more than, compensated for by the combined effects of (a) the larger amount of soil in a block compared with a pot, (b) the elimination of a potting shift when using blocks, (c) probably better rooting following the planting out of blocks. The adverse effect of drying out is at a minimum during the early months of the year when tomatoes are being propagated. The judicious use of a rose-can will help to prevent undue drying out of the blocks during sunny periods. The John Innes composts were used in the tests. The warning is given that the use of composts of poorer texture in the blocks might mean poorer root action and water regulation and hence inferior growth.

1734. KUCKUCK, H., AND SCHMIDT, M.

Zwanzig Jahre Pflanzenzüchtung in Müncheberg. (Twenty years of plant breeding at Müncheberg.)

Züchter, 1948, 19: 129-35 [Noted 19: 827s].

This review of the activities of Erwin Baur's renowned institute since its foundation in 1928 includes an account of its re-formation after the war, on a less ambitious scale, with the support of the Soviet authorities. [The article was written before Mendelian genetics were banned by the Lenin Academy of Agricultural Sciences.]

1735. JOHN INNES HORTICULTURAL INSTITUTION (DARLINGTON, C. D., Editor).

Making new plants: the colchicine method.

John Innes Leaflet 9, pp. 8, or *Coll. John Innes Leaflets*, 2nd edition, 1949, pp. 83-90, illus.

An account in simple language of the meaning of polyploidy and the ways in which colchicine may be used to produce more or differently attractive ornamental plants. As regards the use of new tetraploids there are two reasons for using colchicine to produce them. Firstly colchicine may be used to double the chromosomes of a true-breeding type of plant, and form autotetraploids which may give larger flowers. Or it can be used on desirable but sterile hybrids to double the chromosomes so that allo-tetraploids are produced which are fertile. Methods of colchicine treatment briefly described here are soaking seeds, treating seedlings at the cotyledon stage, moistening the soil over and around seedlings before they emerge, brushing colchicine solution over tips of young shoots, smearing colchicine in lanoline on growing portions of young shoots, and applying colchicine solutions in agar to upright stems. The danger to plants lies in the use of excessively strong concentrations. Suggestions for experiments are made.

1736. DAVIDSON, W. A.
Variety names and the seed laws.
Agron. J., 1949, 41: 161-3.

An account of the steps that are being taken in the United States to regulate the naming of new varieties. The work of the four Variety Committees appointed by the U.S.D.A. to prepare a list of approved variety names and synonyms of cabbage, garden beans, soybeans and sorghum, together with a description of each variety, is considered especially valuable as an aid to the administration of the Federal Seed Act.

1737. MUNN, M. T., AND BUCHHOLZ, A. B.
The quality of seeds on sale in New York in 1948.
Bull. N. Y. St. agric. Exp. Stat. 735, 1949, pp. 40, illus.

This bulletin presents summarized results of an inspection made by the Division of Seed Investigations of the New York State agricultural Experiment Station and the Bureau of Plant Industry, Albany. 2,737 samples of agricultural, flower, vegetable, tree and shrub seeds were bought in the open market during 1948 and tested for germination, field performance, and honesty of labelling. The name of the seed firms from which the samples were taken is given in each case. There is an appendix by A. W. Hofer on "Legume inoculants tested in 1948".

1738. PORTER, R. H.
Recent developments in seed technology.
Bot. Rev., 1949, 15: 221-344, bibl. 502.

An extensive survey, compiled by a member of the American International Association, Brazil, of recent developments in seed technology that have contributed to the efficiency of seed testing for purity and viability, and to a knowledge of seed physiology in general. The material is excellently arranged, and deals with the following aspects of the subject: (1) new and improved methods of seed identification, (2) a uniform method for the determination of pure seed in small-seeded grasses, (3) a practical concept of pure seed, (4) evaluation of weed seeds in crop seed, (5) more uniform evaluation of seed germination tests, (6) the value and treatment of impermeable seeds, (7) dormant seeds, (8) methods for prolonging seed viability, (9) rapid

methods for the determination of seed viability, (10) the relationship of hormones and inhibitors to seed germination, (11) the importance of seed-borne organisms, (12) the use of seed fungicides in seed testing, (13) laboratory methods for measuring germinating capacity under adverse conditions, (14) application of statistical methods to seed technology. [Note the comprehensive bibliography.]

1739. BARTON, L. V.
Respiration and germination studies of seeds in moist storage.
 Reprinted from *Ann. N. Y. Acad. Sci.*, 1945, 46: 185-208, bibl. 208, illus. [received 1949].

A contribution to the study of the physiology of seeds buried in the soil. The seeds used were *Amaranthus retroflexus*, *Impatiens balsamina* and *Rumex obtusifolius*.—Boyce Thompson Inst.

1740. SCHUPHAN, W.
Spektralphotometrische Samenprüfung als neuartiges Hilfsmittel im Samenbau, im Samenhandel, in der Pflanzenzüchtung und im Sortenregisterwesen. (Seed testing by means of a spectrophotometer, as an aid in seed growing, plant breeding and variety certification.)
Ceres, Hamburg, 1949, 2: 4/5: 1-2.

The author has worked out a spectrophotometrical method of seed testing which reduces to approximately 2 hours the time necessary to identify a variety or a species and, moreover, allows conclusions to be drawn on the age of the seed sample. The colouring matter of a certain amount of seed is completely extracted and the transparency of the solutions is measured in different spectral regions. Graphs developed from individual measurements were found to be highly characteristic, as is illustrated by the two graphs of kohlrabi varieties reproduced. A further diagram shows the influence of seed age and maturity on the course of the graph. The application of the method in various fields is discussed.—Staatsinst. f. Angew. Botanik, Hamburg.

Glasshouses.

(See also 1694, 2104, 2582, 2606.)

1741. MINISTRY OF AGRICULTURE.
The construction and heating of commercial glasshouses.
Bull. Minist. Agric. Lond. 115, 1948, pp. 47, 9 plates, 2s.

In the business of erecting a glasshouse unit this bulletin will be a very valuable guide. It contains much practical and detailed information on such subjects as choice of site, materials used in construction, ventilating mechanisms, and problems of erection and business contracts for erection. There is an interesting comparison of the various timbers used in glasshouse construction, and an appendix gives a specimen schedule of materials required for constructing a tomato house 100×30 ft. and a cucumber house 100×15 ft. The section on heating describes the mechanism of the common heating systems, but gives little indication of the practical advantages and disadvantages of each. The new Unit Heater System,

however, in which a house is heated by the circulation of warmed air, is discussed in some detail, and is considered worthy of further trial. Valuable hints are given on the art of stoking and the most efficient use of fuel, and the advantages of mechanical aids to firing are discussed. In this time of rapid development of glasshouse design and exploration of new building materials, the grower would have welcomed a reliable assessment of the new ideas, and a guiding hand through the controversies of a very specialized problem, but the comparative advantages of concrete, steel and wooden houses, the importance of angle of roof and size of pane, and the use of movable structures as a solution to the perpetual problem of soil sickness are subjects scarcely touched on.

1742. ANON.

Horticulture at the B.I.F. [British Industries Fair].

Fruitgrower, 1949, 107: 590, illus.

A system for the air-conditioning and automatic control of temperature and humidity of glasshouses has been designed. The apparatus, known as the "Autoclima", is electrically operated, and is based on the principle of circulation of warmed and humidified air. Initial cost and installation are comparable to those of a normal heating system, and running costs are claimed to be moderate. The largest standard unit available at present is designed for a 50 ft. propagating house.

1743. WITHROW, A. P.

Artificial lighting for forcing greenhouse crops.

S. B. Purdue agric. Exp. Stat. 533, 1948, pp. 27, bibl. 37, illus.

Practical directions for the use of artificial light in the greenhouse (1) to extend daylight by low intensity lighting in order to induce or retard flowering, and (2) to supplement daylight by high intensity lighting in order to produce more vigorous growth. The efficiency and cost of various types of equipment is discussed, the incandescent lamp being recommended as the most satisfactory source for both types of lighting. The flowering control of chrysanthemums is dealt with in detail, and there is a table showing the optimum lighting and temperature conditions for a wide range of flower crops. Crops unsuitable for forcing with artificial light are also listed. High intensity lighting to increase photosynthesis is only considered economic for use on young plants such as tomatoes that can be closely spaced, to supplement daylight during the winter months. A method of propagating rooted leafy cuttings under total artificial light is described.

1744. SPEYER, E. R.

Some uses to which pyrethrum powders have been put in the control of glasshouse pests.

Pyreth. Post, 1949, 1: 3: 27-30.

Some past experimental work is reviewed, from which it is concluded that pyrethrum is inferior to powders containing DDT in controlling thrips on glasshouse plants. But for destroying aphides DDT is uncertain in its action and no insecticide appears to be so effective as pyrethrum for dealing with aphid infections which

are limited to comparatively small areas in glasshouses, thus obviating the necessity for fumigating large areas at a later date.

Soilless culture.

(See also 2330.)

1745. ALBRECHT, C.

Wasserkultur in Deutschland. Das Mineralkultur-Verfahren der Degussa. (Soilless culture in Germany. The "Degussa" mineral culture method.)

Ceres, Hamburg, 1949, 2: 3: 3-4, illus. KOEPPNER, R.

Wasserbeetkulturen und ihre Anwendung in Deutschland. (Soilless culture in Germany.)

Abbreviated reprint from *Dtsch. Garten in Gärtnermeister*, 1949, 52: 41-3, illus.

Trials, carried out for several years by a private firm near Frankfurt/Main, showed that soilless culture on American lines is profitable also under German conditions. Yield increases of 50-100% over compost beds were obtained with tomatoes, cucumbers, melons, lettuce, beans, celeriac and cauliflower. The tankless irrigation method, which is described, can be used by all gardeners with glasshouses of sufficient size, who agree to have their solutions tested and their chemicals supplied by the holder of the patent.

1746. SYKES, W. E.

Soilless gardening in practice.

North. Gdnr, 1949, 3: 119-21, 154-8, 179-82, illus.

A grower puts a case for soilless culture, and describes his own experiences using the Gerick solution method, sub-irrigation, and finally a method of peat culture devised by himself. Nutrients were added to a growing medium of peat by the surface watering system. Owing to the high water-holding capacity and good aeration of peat, it is claimed that a greater latitude may be allowed in watering than is possible with soil culture. Among the plants grown successfully by this method were tomatoes, lettuces, cucumbers, French beans and certain pot plants.

1747. SHIVE, J. W., AND ROBBINS, W. R.

Methods of growing plants in solution and sand cultures.

Bull. N.J. agric. Exp. Stat. 636, 1948, pp. 24, bibl. 11.

The essential features of various methods are discussed, especially from the point of view of the plant physiologist engaged in nutritional studies.

1748. HOPKINS, D. P.

Chemical aspects of soilless growth.

Mfg Chem., 1948, pp. 388-93 (*Brit. Abs.*, 1949, BIII, p. 7).

Plant growth without soil by (a) water culture and (b) sand or gravel beds methods is discussed. In method (a) an air space between the seed tray and the surface of the nutrient solution is essential, but the content of the solution need not be meticulously controlled. Method (b) has been widely applied on rocky islands and in Japan, where the germ-ridden soil gave rise to infections among U.S.A. troops. The

nutrient solutions must have pH 5.0-6.5 and a content of solids such that the osmotic pressure is 0.5-1.5 atm. Details are given of the composition of the major and minor nutrient solutions to be applied. Finally, prospects are discussed.

1749. MULLISON, W. R.

Nematode control in nutriculture.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 467-70.

A water dispersion of a dichloropropene-dichloropropane mixture at a concentration of 600 p.p.m. or of ethylene dibromide at 1,250 p.p.m. gave complete control of the nematode, *Heterodera marioni* in sand culture.

Noted.

1750.

a BEVENUE, A.

Determination of sugars in plant materials. Use of decolorizing carbon in the ferricyanide method.

Analyt. Chem., 1949, **21**: 586-7, bibl. 7.

b CAPLIN, S. M., AND STEWARD, F. C.

A technique for the controlled growth of excised plant tissue in liquid media under aseptic conditions.

Nature, 1949, **163**: 920-1, bibl. 4.

c CONWAY, E., AND ARBUTHNOTT, M.

Occurrence of endotrophic mycorrhiza in the roots of *Pteridium aquilinum* Kuhn.

Nature, 1949, **163**: 609-10, bibl. 5.

d ESCRITT, J. R., AND ARTHUR, J. H.

Earthworm control: a résumé of methods available.

J. Bd Greenkeep. Res., 1948, **7**: 162-72.

e ETTORI, J.

The estimation of peroxidase activity.

Biochem. J., 1949, **44**: 35-8, bibl. 10.

f FRANCO, C. M., AND COSTA, A. S.

A simple aerator for nutrient solutions.

Plant Physiol., 1949, **24**: 320-2, bibl. 1, illus.

g GIBBS, M.

Distribution of labelled carbon in plant sugars after a short period of photosynthesis in $C^{14}O_2$.

J. biol. chem., 1949, **179**: 499-500, bibl. 4.

h KOSTOV, D.

The introduction and use of foreign and wild plants for culture in relation to breeding problems in Bulgaria. [Bulgarian.]

Reprinted from *Rep. agric. sci.-Res. Inst. Sofia*, Vol. 6, 1948, pp. 71.

i LATIES, G. G.

The oxidative formation of succinate in higher plants.

Arch. Biochem., 1949, **22**: 8-15, bibl. 9.

j NEW JERSEY AGRICULTURAL EXPERIMENT STATION.

The New Jersey State Seed Law.

Circ. N.J. agric. Exp. Stat. **520**, 1948, pp. 8. Vegetable and agricultural seed.

k PARKER, F. W.

Future development of U.S.D.A. Research Program.

Agric. Chemls, 1949, **4**: 3: 28-30, 93.

l RAUTANEN, N.

On the synthesis of the first amino acids in green plants.

Ann. acad. Sci. fenn., Ser. A.II Chem., 1948, No. 33, pp. 66, bibl. pp. 5.—Biochem. Inst., Helsinki.

m REIFER, I., AND MELVILLE, J.

The source of ammonia in plant tissue extracts. II. The influence of urea.

J. biol. Chem., 1949, **178**: 715-26, bibl. 6.

n RHODES, J.

The use of cloches in private gardens.

J. roy. hort. Soc., 1949, **74**: 247-52.

o SAÏD, H., AND FAWZY, H.

Comparative study of sucrose inversion and synthesis by carrot and radish root slices.

Nature, 1949, **163**, 605, bibl. 4.

p ŠANTAVÝ, F.

Polarography and spectrography of colchicine, colchicine and similar substances.

Coll. Czech. chem. Commun., 1949, **14**: 145-55, bibl. 28.

The author's 17th communication on substances derived from *Colchicum*.

q SCARISBRICK, R.

Haematin compounds in plants.

A.R. Progr. Chem. 1947, 1948, pp. 226-36, bibl. 62.

r SHIRLEY, R. L., AND BENNE, E. J.

Report on sodium in plants.

J. Ass. off. agric. Chem. Wash., 1949, **32**: 280-6, bibl. 12, being *J. Art. Mich. agric. Exp. Stat.* **985** (n.s.).

s SMITH, F. F., FULTON, R. A., AND LUNG, P. H.

Recent developments in the control of greenhouse pests by liquefied-gas aerosols.

J. econ. Ent., 1948, **41**: 624-30, bibl. 7.

t STEENBERG, F., AND BOKEN, E.

Kobber i Jord og Kulturplanter III. Kobberindhold og Kobbermangel i jyske Jordtyper. (Copper in the soil and in cultivated plants. III. Copper content and copper deficiency in the soil types of Jutland.) [English summary 2½ pp.]

Tidsskr. Planteavl, 1949 (?), **52**: 375-459, bibl. 16, being *Beretr. Statens Forsøgsvirks. Plantekult.* **415**.

u TICQUET, C.

Soilless culture: explaining some common mistakes.

Fruitgrower, 1949, **107**: 713-14.

Practical hints to growers.

v VELDSTRA, H., AND BOOIJ, H. L.

Researches on plant growth regulators. XVII. Structure and activity. On the mechanism of the action.) [Summary in English, French and German.]

Biochim. biophys. Acta, 1949, **3**: 278-311, bibl. 84, illus.

TREE FRUITS, DECIDUOUS.

General.

(See also 2577, 2580, 2585, 2587, 2593, 2599, 2606, 2621, 2628, 2632.)

1751. PALMER, C. D., SCHLOTZHAUER, E. O., AND KIESLER, P. F.
Fruits and nuts: bearing acreage, 1919-1946.
 [Publ.] U.S. Dep. Agric. Bur. agric. Econ. CS32, 1949, pp. 39.

These records give a complete statistical series of estimates in tabulated form of bearing acreages for all the States of America. The survey covers most tree fruits, including citrus, as well as almonds, filberts and walnuts. General trends in the acreage figures for several fruit crops are discussed.

1752. DAVIS, M. B.
Fruit production problems in Canada.
Fruit Var. hort. Dig., 1948, 3: 41-3.

The article, part of a paper presented at the 1948 Centennial Fruit Congress, held at St. Louis, U.S.A., deals briefly with hardy rootstocks, hardy varieties for framework building, small fruits and marketing.

1753. ANON.
The Australian fruit industry.
Fruit World, Melbourne, 1949, 50: 1: 5-9.

The story is given of the development of the fruit industry in different areas of Australia and of its pioneers.

1754. BAGENAL, N. B., AND FURNEAUX, B. S.
Fruit growing areas on the Hastings Beds in Kent. (A survey conducted in 1931-1936.)
Bull. Minist. Agric. Lond. 141, 1949, pp. 37, bibl. 14, illus., 1s. 3d.

This survey should be of real value as an indication of how the area under fruit in the Hastings Beds district, or High Weald, of Kent might most profitably be extended. It has been made on the same lines as the survey by Bane and Jones on the "Fruit-growing areas on the Lower Greensand in Kent" [*H.A.*, 4: 692], and the fact that the same recording technique has been used for both is useful for purposes of comparison. The bulletin is divided into four parts. Part I deals with the geology of the district and gives a classification of the soils. An important difference between the soils of the High Weald and the Lower Greensand lies in the poor natural drainage of many of the former. The second part gives an enthralling account of the history of fruit-growing in the High Weald, followed by a survey of the position in 1931-32, summarizing the kinds and varieties of fruit most commonly grown in the district, the rootstocks used, and the pest and disease situation. In the section dealing with the relation between soils and fruit, a non-technical description of each of the 16 soil series is given, intended to assist the grower in their recognition. The performance of the various fruits on each series is tabulated. In the conclusion (Part IV) it is stressed that the very local distribution of the soil series makes a careful examination of the soil an essential preliminary to planting. The type of fruit that could most profitably be grown or avoided on each soil series is summarized. It is pointed out,

however, that in many cases management may be the critical factor in success. The suggestion is made that soft fruits might well be grown more extensively in the High Weald. Although the publication of this survey had to be delayed for 13 years, its information is of a fundamental nature and its value remains unaffected. The inclusion of a geological map would have been an asset.

1755. HOBBS, E. W.
Fruit-growing in the West of England.
Agriculture, 1949, 56: 151-6.

An introduction on the historical aspects of the subject with notes on some famous nurseries and varieties is followed by a description of the industry's development and its condition to-day.

1756. BARKER, B. T. P.
Cider and the West Country farmer [of England].
Agriculture, 1949, 56: 156-60, bibl. 1.

The author traces the history and development of cider-making in the West of England and reviews the present position of the industry which is suffering from a shortage of good quality cider apples. However, the cultivation of the better county cider varieties is gradually extending, largely as a result of the establishment of a series of trial orchards over the whole of the western counties by the Long Ashton Research Station. Tested varieties can now be recommended for orchard planting, both in respect of orchard performance and vintage merit. There is an immediate need for extensive planting of new cider orchards. If the usual type of standard-tree orchard is planted, there must be a delay of at least 25 years before crops of material tonnage per acre are obtained. Experiments have shown that by planting suitable varieties as bush trees, instead of standards, crops of 5 tons per acre can be reached by the seventh year under suitable conditions. There are signs that the post-war recognition of the alarming decline in cider apple production and the recent efforts to increase the supply have stimulated a widespread effort to remedy the position. While the industry for the next decade or so may still have to contend with a shortage of cider fruit proper, there seems a reasonable probability that ultimately this will be overcome and that the vintage quality of the raw material will be far better as a whole than ever before.

1757. MOTZ, F. A.
The fruit growing and marketing situation in Europe.
Proc. 62nd Conv. Amer. pomol. Soc., 1948, pp. 140-8.

While most articles on fruit-growing in a certain area treat the subject from a regional or national point of view, the present paper refreshingly stresses the international aspect of the fruit marketing problem.

1758. OLAFSON, G.
Frukttreteljinga 1946. (Norwegian fruit tree statistics for 1946.)
Frukt og Baer, 1949, 2: 83-214, bibl. 6.

Very detailed figures on many aspects of fruit-growing in Norway, from which the following may be selected: Number of apple trees about 425,000, of which some 100,000 are stated to be on dwarfing rootstocks, the rest on seedlings. Gravenstein, with 117,000 trees, is the most widely grown variety. In the new plantings it continues to be represented with about 25%, with Torstein a close second. Pear trees number 115,425; plums 152,000; sweet cherries 33,125 and sour cherries 22,150. Of the better known apple varieties grown in England only Bramley's Seedling, Cox's Pomona and James Grieve are of any importance.

1759. KVAAL, E.

Statens forsøksgard Njøs. Forsøksstasjon i fruktdyrking. (The Norwegian fruit experiment station at Njøs.)

Frukt og Baer, 1949, 2: 26-34.

This is a general report of the work carried out since 1919 at the small Norwegian fruit research station at Njøs, situated in a favourable climate with mild winters at a latitude of 61° 11' to the west of Oslo. The research programme includes:—(1) Variety trials with the dual object of establishing varieties true to name and of selecting the most suitable ones for the special conditions of the country. (2) Rootstock trials, in which East Malling apple, pear and plum stocks, as well as *Malus baccata* and other frost-resistant Russian species, are tested. Attempts are made to overcome the incompatibility of the latter by selection and by the use of intermediates. (3) Storage trials. (4) The breeding work in progress or intended includes peach, apricot and vine. (5) Physiological experiments are concerned chiefly with blossom and fruit thinning.

1760. GUENGERICH, H. W.

Fruit growing in Mexico.

Proc. 62nd Conv. Amer. pomol. Soc., 1948, pp. 128-31.

Deals chiefly with apples which are grown successfully at the higher altitudes. In spite of favourable conditions for scab, the author did not find any. Codling moth is not of economic importance, particularly at elevations above 5,000 feet, but the rose chafer is a serious pest of fruit trees and other crops in some areas. DDT has been used for its control with good results.

1761. TALBOT, F. M.

Apricot growing in Central Otago.

N.Z. J. Agric., 1949, 78: 149-53, illus.

Central Otago is the principal area of apricot production in New Zealand. The history of the industry in that area is outlined. Some of the trees, claimed to be 75 to 80 years old, are still growing well and bearing good crops of fruit annually. An account is given of the climate and topography of the area, with advice on all cultural operations. Among the most popular varieties grown there are Moorpark, Roxburgh Red, Oullins Early, Newcastle, Mansfield, Tilton, Hemskirk, Royal, Trevat, and Boulton. Peach seedling rootstock is the most suitable for gravelly and light sandy soil, myrobalan plum stock for heavy soils of clay loam type, and apricot seedling stock for well-drained rich soils.

1762. ČERNENKO, JU. S.

The fig. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 23-5, illus.

The fig tree and its fruit are briefly described and reference is made to new varieties that are being raised at the Soçi research station to suit local conditions. Four of those varieties and four new seedlings are described.

1763. FREGOLA, C.

L'olivo e il freddo. (The olive's susceptibility to cold.)

Ital. agric., 1949, 86: 269-73, bibl. 6.

The author discusses the difficulty of successful olive growing inland in Tuscany due to the low winter temperatures sometimes experienced there. He shows how choice of site and selection of material can help.

1764. CARESCHE, L.

La culture du murier en Indochine. (The cultivation of the mulberry in Indo-China.)

Agron. trop., 1949, 4: 115-38, illus.

An article for producers of raw silk. A description and a comparison of the mulberries of Indo-China is followed by an account of their propagation and cultivation. Yields, longevity of plantations, pests and diseases are discussed.

Genetics and breeding.

(See also 2594.)

1765. MORETTINI, A.

Il miglioramento genetico delle piante da frutto. (Genetical improvements in fruit plants.)

Riv. Ortofrutt. ital., 1948, 32: 173-86.

In this résumé of a paper read before the Congress of Genetics applied to Agriculture held at Turin in October, 1948, the author notes the chief aims and successes achieved in the U.S. and other countries in the sphere of fruit breeding. It will be of general interest to note that the author has succeeded in interesting the Italian National Research Council in the establishment at Florence of a Centre for the Improvement of Fruit Plants.

1766. GRANHALL, I.

Frukträdens köldhärdighet och växtförädlingen. (Breeding for cold resistance in fruit trees.)

Fruktodlaren, 1949, pp. 74-8.

A general discussion of the problem is followed by a description of the new freezing chambers installed at the Swedish fruit breeding station of Balsgård. They are to be used in the selection of breeding material as well as in testing existing varieties for cold resistance. The lowest temperature to which apple varieties were subjected in the first experiment was -36° C., while the treatment of pears did not exceed -25° C. Rootstocks are included in the investigation.

1767. NILSSON, F.

Mälsättning för växtförädlingen av fruktträd och bärbuskar. (Aims of top and soft fruit breeding in Sweden.)

Sverig. pomol. Fören. Årsskr., 1948, 49: 31-8.

Experience has shown that but few foreign fruit varieties are suited to Swedish climatic conditions. The breeder's aim must, therefore, be to combine the properties of fully acclimatized and hardy local varieties with the fruit quality of accepted standard varieties. *Pome fruits.* With apples the chief aim is to extend the season by producing earlier varieties of better quality and late keepers, especially the latter. The solution of the rootstock problem has been carried a step forward by the propagation of A2 [see abstract 1795]. With pears, too, better keeping quality is the most important object, and it is hoped that the cross Doyenné du Comice \times Johanthorp, a hardy local pear, will yield the desired result. Until a hardy quince is found to replace seedling rootstocks, the search for mother trees that produce uniform apogamous seed will continue. *Stone fruits.* A higher degree of earliness and hardness are the aims in plum breeding, where a promising start has been made with the variety Opal [see abstract 1779]. Differences in hardness of *Prunus cerasifera* rootstocks call for the selection of the most resistant strains. Bacterial canker is the worst trouble sweet cherry growers have to contend with. Clonal rootstocks which are less vigorous than cherry seedlings are being tried. *Small fruits.* Gooseberry breeders are trying to combine hardness and mildew resistance with fruit quality and size. Species crosses between *Ribes divaricatum* and *R. niveum* have yielded promising material. With black currants the winter of 1946/47 has shown the necessity for using Finnish and north Swedish varieties as parents. Mitra and Miranda [H.A., 18: 1673] are the answer to the raspberry problem. In strawberry breeding more attention will have to be paid to the requirements of the developing canning industry.

1768. CRANE, M. B., AND LEWIS, D.
Genetical studies in pears. V. Vegetative and fruit characters.
Heredity, 1949, 3: 85-97, bibl. 12.

The inheritance of characters of leaves, growth and fruits of pears have been studied, and of resistance to pear scab. In pears, unlike apples, five simple Mendelian differences of the leaves and growth have been found. These are used in a classification of cultivated varieties. The range of variation of fruit characters is more or less continuous, and no complete dominance of any character is shown, although incomplete dominance is commonly evident. In fruit size and shape, seedlings from cultivated varieties tend to revert to the wild type, but not in other characters such as texture, sweetness and season of ripening. Resistance to pear scab is shown to have a polygenic basis. The varieties Giffard and Conference appear to have a high resistance-giving capacity, and there are indications that the character for scab resistance is associated with a stiff, narrow leaf.—John Innes Horticultural Institution, Bayfordbury.

1769. BALDINI, E.
Il miglioramento genetico del pero in Italia.
(Pear breeding in Italy.)
Riv. Ortofrutt. ital., 1949, 33: 4-10, bibl. 9.

The author points out that whereas a few years ago the aim of the breeder was the luxury pear, nowadays it is essentially as follows:—(1) the production of varieties better in regard to quality, preservation, resistance to

transport and general utility purposes in Italy and abroad, (2) varieties whose fruits will ripen in times of market scarcity, (3) varieties resistant to disease, (4) varieties which can thrive under particular conditions of soil and climate. Selection will then follow the usual lines of crossing and mass selection. The genetical build-up of the pear is discussed and the difficulties encountered are set out.

Varities.

(See also 2547.)

1770. KINMAN, C. F.
Report of the committee on new fruits and nuts for 1947.

Proc. 62nd Conv. Amer. pomol. Soc., 1948, pp. 158-210.

"This report, while not complete, covers many of the varieties appearing since the last A.P.S. list was published in 1943. Apples, crab apples, cherries, currants, grapes, muscadine grapes, peaches, pears, plums, raspberries, strawberries and tung nuts are the fruits covered."

1771. BREGGER, J. T.
Trends in fruit varieties.

Proc. 62nd Conv. Amer. pomol. Soc., 1948, pp. 148-54.

The paper really constitutes a report of the Society's variety appraisal committee. Apple: Two trends are clearly discernible: (1) the planting of fewer varieties and (2) the preference for red sports over the old standard varieties. For Delicious and Rome planting is almost exclusively confined to red strains. Peach: In contrast to apples, there is a tendency to increase the number of varieties, especially of the late type to extend the harvest season. The ripening sequence of standard and new varieties, including untested ones, is indicated in a table. Cherries, plums, vines: These are dealt with more briefly, with reference to fuller articles in *Fruit Varieties and Horticultural Digest*, 1948, Vol. 3, No. 1 [see below, 1774]. Strawberry: The discussion shows that the trend is regional in nature. Ever-bearing varieties as a class are not popular.

1772. WIKSTRÖM, H.
Försök med amerikanska fruktträd i Bohuslän 1925-1943 och skördesiffror från inhemska fruktträd 1929-1944. (Trials with American top fruit varieties in the Swedish county of Bohus, 1925-1943 and yield data of native varieties 1925-1944.)
Sverig. pomol. Fören. Årsskr., 1948, 49: 145-52.

Only very few of the American varieties tested were a success in Sweden.

1773. ALDERMAN, W. H., AND OTHERS.
Five new varieties of fruits.
Minn. Hort., 1949, 77: 37, being *Pap. misc. J. Ser. Minn. agric. Exp. Stat.* 652.

Oriole, a summer apple; Golden Spice, a pear variety good for sauce, ripening in mid-September; Orient, a self-fertile Nanking cherry (*Prunus tomentosa*); Redglow and South Dakota, two dual purpose plums.

1774. BREGGER, J. T.

National survey of plum, cherry and grape varieties.

Fruit Var. hort. Dig., 1948, 3: 6-8.

The Montmorency and Concord varieties virtually monopolize the sour cherry and the northern grape industries respectively. In the case of plums the Italian Prune dominates the North-west, while Stanley is coming to the fore in the North and East. Windsor ranks first among the sweet cherries grown, except in the far West, where Bing and Lambert take first and second place.

1775. MINISTRY OF AGRICULTURE, LONDON.

Commercial varieties of apples and pears.

Advis. Leaflet N.A.A.S. 343, 1949, pp. 4, 1d.

Short descriptions, including notes on disease susceptibility, of the three or four varieties of dessert apples, culinary apples, and pears most widely grown commercially, and of certain other varieties suited to particular districts. For choice of pollinating varieties, readers are referred to *Bull. 133*, "Apples and Pears".

1776. SCHAEER, E.

Eine Farbmutation der Apfelsorte "Wellington". (A red sport of the apple variety Wellington.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 246-8.

The sport was discovered by a Swiss grower. The red fruit colour is considered to be useful, since it makes the apple more attractive to the consumer and is also preferred for juice production.

1777. WEEKS, W. D.

The Galbraith Baldwin.

Fruit Var. hort. Dig., 1948, 3: 46.

A highly coloured Baldwin sport, propagated at the University of Massachusetts.

1778. THELEN.

"Johannes Böttner-Apfel"—eine wertvolle Neuzüchtung. (The Johannes Böttner apple, a valuable new variety.)

Dtsch. Garten., 1949, 60B: 2: 11.

This variety, which has been continually improved by the breeder, is already widely grown in the Rhineland, where it is appreciated for its high yields and freedom from woolly aphid and canker, and for its keeping qualities.

O.J.

1779. JOHANSSON, E.

Opal—en ny Svensk Plommonsort. (Opal, a new Swedish plum variety.) [English summary, ½ p.]

Sverig. pomol. Fören. Årsskr., 1948, 49: 77-82.

The new variety, which is described and illustrated, has its origin in a cross of Oullins Golden Gage × Early Favourite, made at Alnarp in 1925. It is early flowering, self-compatible and a heavy cropper. The fruit, resembling that of Czar in shape, is juicy and sweet. In the south of Sweden it ripens about the middle of August.

1780. MALIGA, P.

Adatok a kajszifajták alkati meddőségéhez. (Sterility in apricot varieties.) [German summary ½ p.]

Bull. Fac. Hort. Budapest, 1948, 12: 74-80, bibl. 3.

In apricots there are six types of ovary (illustrated), of which only two are fertile. Though the percentage of sterile flowers varies, the largest number of fertile ovaries has always been found on fruiting wood, while flowers on suckers, and especially their laterals, show a high proportion of sterility. Sterility is, moreover, more severe in drastically pruned trees. The relative proportion of fertile and sterile flowers was shown to be a varietal characteristic, not influenced by locality. All dropped flowers had sterile ovaries.

1781. GIDOIN, M.

Classification des variétés de cerisiers.

(Classification of cherry varieties.)

Arbres et Fruits, 1949, No. 37, pp. 12-15, 18-26; No. 38, pp. 3-8, illus.

Brief notes on origin and classification, time of ripening of different sorts, and the standard varieties for dessert, industry, and distillation, are followed by descriptions of the chief varieties cultivated in the Orleans region of France in order of ripening.

1782. MANN, A. J., AND KEANE, F. W. L.

The Van cherry.

Fruit Var. hort. Dig., 1949, 4: 12-13.

A brief description of the black, Bing-type Van cherry bred at Summerland, B.C. It is resistant to cracking, self-fertile and interfertile with a number of varieties, including Bing and Lambert.

1783. CAPUCCI, C.

La ciliegia Moretta di Cesena. (The cherry variety Moretta di Cesena.) [English and French summaries 12 ll.]

Riv. Fruttic., 1949, 11: 49-74.

The author describes the conditions of soil, climate and cultivation under which this cherry is grown in the Romagna district of Italy, its pests and diseases and the commercial qualities of its fruit. It is probably the same as the variety Black Eagle.

1784. KÁRPÁTI, Z.

Megjegyzések néhány berkenyéről. (Observations on some *Sorbus* varieties.) [German summary 6½ pp.]

Bull. Fac. Hort. Budapest, 1948, 12: 119-59, bibl. pp. 7, illus.

- (1) The geographical distribution of *Sorbus domestica*.
- (2) A new variety from the Vértes mountains: *S. borosiana*.
- (3) An interesting species from the Balkans: *S. aria*.

1785. RUGGIERI, G.

Primo contributo alla conoscenza della biologia dell'olivo coltivato in Sicilia.

(A first report on the biology of olive varieties grown in Sicily.) [English summary 1 p.]

Ann. Sper. agrar., 1949, 3: 237-54, bibl. 19.

The author discusses the self-fertility and self-sterility of the olive varieties grown in Sicily. He considers the problem offered by ovary abortion, which he believes to be of primary importance, and describes work in which he observed the incidence of the phenomenon under different ecological conditions.—Staz. sper. Frutt. Acireale.

Propagation and rootstocks.

(See also 1713, 1731, 1876, 2574.)

1786. KARNATZ, H.

Der Einfluss der Saattiefe auf den Auflauf bei Obstsämereien. (The influence of depth of sowing on the germination of fruit seed.) *Mitt. Obstb. Versuchsr. Jork*, 1949, pp. 49-50.

In trials with bird cherry, plum and apple varieties the highest percentage of germination was obtained with seed sown at a depth of 1.5 cm.

1787. KARNATZ, H.

Über die Lagerung von Obstsaaten bei tieferen Temperaturen und bei Normaltemperatur unter Luftabschluss. (The storage of fruit seed at low temperature and at normal temperature in the absence of air.) *Mitt. Obstb. Versuchsr. Jork*, 1949, pp. 33-5, bibl. 1.

Storage of fruit seed becomes necessary, if it reaches the nurseryman too late for immediate sowing or stratification. Trials carried out for a period of 12-17 months showed that with pome fruits the germination capacity is retained better at a temperature of -16°C . than at -0.5°C . or $+15^{\circ}\text{C}$. With cherry seed the advantage of low temperature storage was found to be less marked. Pome fruit seed kept in sealed beer bottles did not benefit from the exclusion of air.

1788. BERGH, T. K.

A method of seed cleaning.

Amer. Nurserym., 1949, **89**: 8: 7-8, illus.

A rapid and efficient method of seed cleaning used successfully at the Soil Conservation Service nursery at Winona, Minn., is described in detail. The seed is processed and washed in a hammer mill fitted with a screen of appropriate-sized mesh. From 36 to 54 bushels of fleshy fruit, such as cherry, plum or rose, can be cleaned in a day by two men using this method.

1789. DIAZ, J. R.

Postmaduración de semillas y cultivo de embriones de duraznero. (After-ripening and embryo-culture of peach seeds.) [English summary 1 p.] *Rev. Fac. Agron. B. Aires*, 1948, **12**: 80-113, bibl. 31, illus.

Normally peach seeds will not germinate until they have undergone an after-ripening process brought about by a long period of exposure to cold. Much work has been done in America on stratification of the seed and culture of excised embryos to overcome this difficulty. In embryo-culture of freshly harvested seed, plant breeders have found a rapid method of determining the germinating power of peach seeds. It also overcomes the problem of embryo abortion in seeds of interspecific crosses, and crosses in which the female parent is an early maturing variety. In this paper the author gives a very comprehensive survey of the work that has been done on this problem, and describes experiments carried out at the Instituto de Frutivicultura, in which the germination of peach seeds treated in various ways is compared. Important details of technique are considered. It was found

that the best growth and good germination was obtained from seeds (without the endosperm) that had been stratified at 0°C . for 11 weeks. The highest percentage germination was obtained from excised embryos grown in a culture of agar-agar and water, or in moist cotton wool. Embryo-culture, however, always results in a certain degree of dwarfing, and it is essential to maintain aseptic conditions to prevent fungus attack.

1790. ZATYKÓ, I.

Új módszer gyümölcsfajták és alanyok ivartalan szaporítására. (A new method of propagating fruit varieties and rootstocks.) [German summary 1 p.] *Bull. Fac. Hort. Budapest*, 1948, **12**: 69-73, illus.

In cases where earthing up failed to produce roots, the following method could be relied upon to give results: Two- to three-year-old rootstocks were dug up early in spring and heeled in until the leaves appeared. Then 10-15 cm.-long root cuttings were made and kept under moist straw. After a fortnight buds developed, whereupon the cuttings were dipped in a slurry, placed 5 cm. apart in trenches, covered with 1-2 cm. of soil and watered heavily. During the summer the cuttings formed an average of 3-4 shoots, most of which developed roots on earthing up. In spring all shoots, rooted or not, were planted up in the nursery, the soil round the unrooted ones being mulched with stable manure after watering in. The following year the root cuttings again formed shoots. Propagated in this manner crab apple and pear averaged [annually ?] 4-5 shoots per cutting, cherries and myrobalan 2-3. The same method was applied successfully to root cuttings of old trees and to the propagation of deeply planted scion-rooted varieties. Large-scale use of this technique yielded 100,000 rootstocks in 1947.

1791. HÜLSMANN, B.

Die gegenseitige Beeinflussung von Unterlage und Edelreis bei den Hauptobstarten in der Baumschule. (A nursery study of the mutual influence of rootstock and scion in the chief fruit varieties.) *Züchter*, 1948, **19**: 14-59, bibl. 45.

The investigation was carried out at the experimental nursery of the Berlin University institute of horticulture from 1932 to 1942 to study the following problems: (a) How many maiden and saleable trees are obtained from each type of rootstock and what is the influence of the rootstock on the scion variety during the early period of their combination? Observations on these points include, of course, a study of compatibility. (b) What is the influence of the scion variety on the root system of the rootstock during the same period? Results were not clear cut, but some of the author's conclusions are of interest and are given below:— (1) In pome fruit maiden trees rootstock influence is hardly noticeable, but the number of saleable trees varies largely with the rootstock used. The highest percentage, 96.6, was recorded for Bath on E.M. XVI and the lowest, 10.7, for Cox on E.M. IX. To a certain extent the vigour of the scion variety comes into play as well, at least in the case of first and second grade trees. Symptoms of incompatibility do not appear until the second year. They occurred in some

quinces irrespective of the variety worked on them. (2) In half-standard plum trees differences in yield of trees were considerable both on different rootstocks and with different varieties worked on the same rootstock. Certain combinations are incompatible. (3) In peach and apricot the rootstock determines the degree of compatibility, whereas the variety has little influence. On the average the best results were obtained on peach seedling, but Ackermann, Hüttner 3 and 4, Kroosjes Yellow and myrobalan seedling can still be described as satisfactory. Differences in the performance of the same rootstock in combination with plum, peach and apricot were considerable. A *Prunus* rootstock that can be recommended for general use does not exist. (4) In pome fruits measurements of the top do not reveal differences in vigour until the second year. The effect of the rootstock on the length of leaders and scaffold branches is generally similar to that on stem diameter. (5) Only in the pear is the diameter of the rootstock and the stem approximately the same. In apple and plum the scion variety exerts a certain influence on the rootstock stem. (6) The classification of vigour elaborated for 2-year-old pome fruit bush trees and 3-year-old half-standard plum trees does not correspond completely with the classification of East Malling. Differences in climate, in soil and in the varieties used would account for discrepancies. (7) There is no strict correlation in pome fruit bush trees between compatibility and the yield and vigour of saleable trees, though dwarfing rootstocks, in most cases, yield the lowest number. In plums compatibility and yield are more closely correlated. (8) The scion variety exerts a distinct influence on the quantitative development of the root system without altering the features characteristic of the rootstock type. The influence of individual pear varieties is more uniform than that of apple varieties.

1792. DU BRUCK, P.

De beworteling van vruchtbomen. (Fruit tree root systems.*) [English summary $\frac{1}{2}$ p.] *Meded. Dir. Tuinb.*, 1949, 12: 284-98, bibl. 9, illus.

The root systems of ungrafted apple and pear stocks have been examined at the Experimental Garden of the Government Horticultural School at Hoorn, Holland. The trees (12-year-old) were in sandy clay with underlying soil of lighter texture. The main roots penetrated mostly to a depth of 30-40 cm. Apple E.M. XII had the strongest root system, followed by Quince A, Apple types I, II, IX, and Quince C. The roots usually did not penetrate to depths of more than 50-55 cm. The root system of weak stocks were not shallower than those of strong stocks. A high water table and unfavourable air supply checked deep rooting. The marked difference between these results and those obtained at East Malling on similar rootstocks are attributed to differences in soil conditions. The results obtained in Holland and elsewhere prove the importance of field investigation directed to determining the connexion between the development of a crop on the one hand and the structure of the soil profile and soil conditions on the other. It is concluded that the roots react strongly to the distribution of humus, the structure, and the water content of the

soil. It is possible that on sandy soils, where the roots penetrate only into a shallow layer, the growth of the trees may be good, if the humus and moisture content of the soil is favourable.

1793. ENIKEEV, H. K.

On the propagation of apple seedlings from pieces of root. [Russian.] *Sad i Ogorod* (Orchard and garden), 1949, No. 3, pp. 14-16, illus.

The propagation of seedling apples from root pieces is described and data are given of results obtained with three hybrid seedlings.

1794. PANSIOT, F.

L'état actuel des recherches sur le comportement des porte-greffes du pommier et du poirier. (Present state of research on the behaviour of apple and pear rootstocks.) *Jardins Fr.*, 1949, 3: 93-104, 118-24, bibl. 6, illus.

In this survey of the apple and pear rootstocks used in France, England, Belgium, Holland, Switzerland, America and Canada it is pointed out that observations made on stock performance in the various countries do not always agree. This may be due to differences of environment, and the need for testing standard rootstocks under French conditions is stressed. Identification and selection of local French rootstocks, too, is shown to be an urgent problem if exports are to be maintained.

1795. JOHANSSON, E.

Grundstamstypen A2 till äpple. (Apple rootstock A2.) [English summary $\frac{1}{2}$ p.] *Sverig. pomol. Fören. Årsskr.*, 1948, 49: 71-6, bibl. 1.

A2 was selected at Alnarp in 1920 from imported rootstocks and raised vegetatively. An illustrated description is given. In numerous trials, carried out in different parts of Sweden, it was found to be as vigorous as E.M. XVI, to be very hardy and to induce early bearing. It is easily propagated in stool beds and by hard-wood cuttings. Cox's Orange trees planted in 1939 yielded from 1943 to 1948 a total of 88 and 46 kg. on A2 and E.M. XIII respectively. The corresponding figures for Laxton's Superb are 141 and 78 kg. Belle de Boskoop trees planted in 1942 yielded 20.9 and 2.5 kg. from 1946 to 1948 on A2 and E.M. XVI respectively. Comparative data are tabulated for three other varieties. It is anticipated that A2 will largely replace seedling rootstocks, especially for the less vigorous varieties.

1796. HÜLSMANN, B.

Veredlungsversuche mit vegetativ vermehrten Apfelunterlagen. (The working of vegetatively propagated apple rootstocks.) *Züchter*, 1949, 19: 187-91, bibl. 3.

The present paper carries the records of the investigation [see abstract 1791] to 1941, confining itself to apples. Earlier results are generally confirmed, though they are now in better agreement with the classification of East Malling. Vigorous rootstocks continued to yield a higher percentage of saleable trees than dwarfing types.

* See also 1713, 1714.

1797. HÜLSMANN, B.

Erste Veredlungsversuche mit Unterlagenklonen aus Apfelwildlingen. (First nursery trials with worked rootstock clones obtained from apple seedlings.)

Züchter, 1949, 19: 199-205, bibl. 2.

For a report of the first phase of the long-term project see *ibidem*, 1947, 17/18: 224-32; *H.A.*, 19: 107. The present paper discusses the nursery behaviour, during the period 1937-39, of 155 apple seedling clones selected for their qualities of easy vegetative propagation, over 17,000 worked rootstocks in 1,175 combinations being available for statistical evaluation. The results, presented in detail, show that 49 clones, preponderantly vigorous ones, gave a good yield of saleable 2-year-old trees, while 65 others proved satisfactory. The material tested covers the whole range of vigour, from the vigorous (15) to very dwarfing (1) types, and it promises to enlarge the list of desirable apple rootstocks for special requirements.

1798. SCHEIL, W.

Die Veredlung unserer Stammbildner. (The grafting of stem builders.)

Mitt. ObstVersuchr. Jork, 1949, pp. 25-6.

The advice is given not to graft stem-builders of pome or stone fruits until 5-8 years after planting and then to framework the 3 to 4 well-trained scaffold branches which form the top.

1799. HILBORN, M. T.

Incompatibilities in top-worked hardy intermediate stocks.

Fruit Var. hort. Dig., 1948, 3: 37-40.

A progress report of the research programme initiated at Maine to study potential hardy apple stem-builders in the hope of eventually replacing Virginia, and perhaps Hibernia.

1800. AUBERT, P.

Rendements comparatifs de poiriers greffés sur franc et cognassier. (Comparative yields of pears worked on seedlings and quince.)

Rev. romande Agric. Vitic., 1949, 5: 29-31.

In the Lausanne area pears on quince often lack vigour. The trial was laid down in 1935 at the Domaine de Pully branch of the Lausanne research station to determine the effect of quince and seedling rootstocks and of quince plus an intermediary on bush trees of the varieties Passe Crassane and Bartlett. (1) Passe Crassane. After 15 years trees on quince were slightly larger than those on seedlings, yields and fruit quality being practically equal. Double working (intermediary Beurré d'Amanlis) reduced vigour and yield. Further observations on length of economic life are necessary to decide on the relative merits of the two rootstocks. (2) Bartlett. Trees on seedlings had double the size and produced double the fruit of trees on quince and on quince plus intermediary. Fruit quality was the same in all cases, though fruit size was a little inferior in pears from trees on seedlings.

1801. MORETTINI, A.

La influenza dell'innesto intermedio nella Butirra Clairgeau. (The effect of double working Beurré Clairgeau pear.) [English summary 9 ll.]

Riv. Ortofrutt. ital., 1949, 33: 35-42.

Fifteen years' work and observations by the author on Beurré Clairgeau doubleworked on Beurré Hardy on a quince rootstock show that its production thus worked is much superior to that when worked direct on quince or, for the first fifteen years, to that when worked on seedling pear. Since then, however, trees on seedling have yielded the most.

1802. HERR, F.

Ergebnisse einer zehnjährigen Pflaumen-Hochstamm-Sorten- und Unterlagenvergleichspflanzung. (First results of plum variety and rootstock trials.)

Mitt. ObstVersuchr. Jork, 1949, pp. 29-30.

The results are summarized of 10 years of tests with plum standard trees carried out in a nursery in the Rhineland. Final results will not be available for another 5 years.

1803. CLARKE, W. S., Jr.

Cherry rootstocks in Pennsylvania.

Fruit Var. hort. Dig., 1949, 4: 40-2.

A semi-popular account of a 15-year orchard trial, inaugurated by the Department of Agriculture, in which three varieties of sweet cherries and two of sour cherries were tested on mazzard and mahaleb stocks from several sources. Owing to frosts only one commercial crop was borne during the whole period. With sweet cherries the weight of evidence still favours mazzard rather than mahaleb stocks.

1804. WELCHERT, P.

Zum Pfropfen von Süßkirschenbäumen.

(The grafting of sweet cherry.)

Mitt. ObstVersuchr. Jork, 1949, pp. 22-4.

In the cherry growing areas of the Prussian province of Saxony it has been customary for decades to plant *Prunus avium* from seed instead of grafted trees and to framework 3-4 scaffold branches 2-3 years later, when growth is vigorous. The advantages claimed are various, a reduction of the risk in the case of several grafts, as compared with one only, being the chief merit. If the operation is carried out at flowering with scions kept dormant in storage at a temperature of 5-7° C. and a relative humidity of 85-95%, the take should be at least 95%. Giant *P. avium* trees in the Harz mountains with a silvery bark and resistant to gumming are the source of most of the seedlings used.

1805. PETJAEV, S. I.

Propagation of the olive by cuttings.

Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 27-8.

An account of the successful rooting of olive cuttings is recorded. The cuttings (hardwood, softwood or semi-hardwood) are taken from 25 May to 15 June; this is the best time, and such cuttings produce callus in 7-8 days and roots in 12-14 days. They are rooted in a 4×4 m. double-sloped greenhouse fitted with staging at two heights. The cuttings are put in the soil to two-thirds their length and shaded in summer at 1 m. above the roof. The lower staging is illuminated with one 100-watt lamp for each square metre of surface. The whole staging is covered with a closely fitting frame to maintain moisture. All the wooden parts of the house are disinfected with 5% copper

sulphate solution and then whitewashed and the staging is treated with 3% copper sulphate once or twice a week. To increase the percentage rooting of the cuttings they may be treated with a growth substance.

Pollination.

1806. SCHANDERL, H.

Eine neue Methodik der Bestäubung von Obstblüten ohne Verwendung von Isoliertüten oder Musselinbeuteln. (A new method of pollinating fruit trees without isolating the flower by paper or muslin bags.) *Züchter*, 1949, 19: 191-2.

Shortage of materials in post-war Germany suggested the following simplified method of controlled pollination: Instead of isolating the whole flower in a bag, the stigma is isolated with a smear of vaseline. The technique is as follows:—In flowers which are on the point of opening, the stigmata are exposed by removing a sufficient number of anthers and petals. After pollination the stigma is enclosed in a smear of vaseline applied with forceps. In apples and pears the five styles are pressed together so that the five stigmata are enclosed in a single smear. Pollination takes place even if the stigma has not started to secrete at the time of the treatment. The flowers are not visited by bees if the petals are removed, but in any case bees were found to avoid the vaseline. Apart from the saving in labour and materials the stigma isolation method has the advantage that it does not expose the shoot to an artificial bag climate with its attendant drawbacks. With cherries it was as successful as orthodox methods of isolation, and with apples it was twice as good as bagging.

1807. DUHAN, K.

Untersuchungen über die Blühverhältnisse und den Einfluss der Pollensorte auf die Fruchtausbildung bei Äpfeln. (Investigations on flowering in apples and on the influence of the pollen variety on fruit development.)

Bodenkultur, 1949, 3: 63-82, bibl. 31.

An attempt has been made to clarify the following terms on the basis of the author's observations and pomological usage. Self-sterility, sterility caused by nutritional factors, anther sterility, dioecism, cytologically-caused pollen sterility, triploidy, inter-sterility, self-fertility, parthenogenesis, apogamy and parthenocarp. The causes of these phenomena, with special reference to their effects on apple growing, are discussed. The list here given of cases of inter-sterility in apple varieties considerably exceeds other similar lists, which suggests the necessity for further pollination trials. In approximately 170 microscopical pollen germination tests certain apple varieties not previously studied were classified as good and bad sources of pollen; moreover, results obtained elsewhere were confirmed in Styria. In pollination trials carried out with over 7,000 isolated flowers more than 80 new fertile combinations between important Austrian varieties have been discovered. The dates of flowering of numerous apple varieties based on 4 years' phenological observations are shown. [From author's summary.]—Hochschule f. Bodenkultur, Vienna.

1808. STANKOVIČ, D. M.

Pollinating apples and pears. [Yugoslavian, with summaries in Russian and French.]

Yearb. Fac. Agric. For. Univ. Belgrade, 1948, pp. 287-92, bibl. 3.

In spite of unfavourable weather in 1947 the pollination of apples and of one pear (Vicar of Winkfield) was generally successful with the exception of Delicious which, because of the cold wet weather, did not retain a single fruit. Lists of successful pollinators are given for Belle de Boskoop, Budimka, Jonathan, Kolačarka, Golden Winter Pearmain apples and the Vicar of Winkfield pear. The pollination was carried out to obtain hybrid seed.

1809. BULLOCK, R. M.

Is commercial artificial pollination practical?

Proc. 62nd Conv. Amer. pomol. Soc., 1948, pp. 39-49, bibl. 5.

The author's verdict on various methods of artificial pollination may be summed up as follows: Hand pollination: though expensive and time-consuming it is still the most satisfactory method for apples. Bel-lows-type hand duster: is wasteful of pollen and gives uneven set of fruit. Water pollen spray: pollen does not adhere to stigma and it is injured after being in water 15-30 minutes. Pollination by aeroplane: three years' studies at Wenatchee have shown no benefit, even if application is carried out under very favourable conditions. Pollen bomb: thoroughly studied, but no increase in fruit set observed, damaging effect on pollen. Bee-hive insert: two types tested so far were unsatisfactory; an improved design remains to be tested. Lycopodium, powdered skimmed milk and egg albumen showed promise as pollen diluents. A sufficient number of pollinator branches should be grafted in every orchard, since artificial pollination is to be regarded only as an insurance against weather conditions.

1810. STEWART, W. S., AND CONDIT, I. J.

The effect of 2,4-dichlorophenoxyacetic acid and other plant growth regulators on the Calimyrna fig.

Amer. J. Bot., 1949, 36: 332-5, bibl. 2, illus.

Trials conducted at the Citrus Experiment Station, Riverside, California, showed that mature, seedless fruit could be obtained from non-caprifig Calimyrna figs by spraying the fruit with 2,4-D and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) at concentrations of 250 p.p.m. Treatment when the fruit had reached nearly maximal size was found to hasten ripening. Earlier applications were ineffective and damaging. The concentration necessary to induce fruit growth, however, caused injury to foliage, and further investigation is needed before the treatment can be applied commercially.

1811. STANKOVIČ, D.

Hormones to induce parthenocarp and to prevent early fruit drop in apples, pears and plums. [Yugoslavian, with summaries in Russian and French.]

Yearb. Fac. Agric. For. Univ. Belgrade, 1948, pp. 349-59, bibl. 5.

The author reviews previous work and tabulates his

own results. He concludes that parthenocarp can be artificially induced by hormone sprays on apples and pears but not on plums, and that preharvest fruit drop can be reduced in certain varieties of apple and pear.

Growth and nutrition.

1812. JENSEN, G.

Hvor stærkt vokser æbler ? (The rate of apple growth.)

Erhvervsfrugtavl., 1949, 15: 216-18.

Continuing his measurements (see H.A., 19: 120) the author found that from 5 August to 16 September, 1948, in Denmark, Cox's Orange fruits increased their volume from approximately 53 to 113 c.c. (average of 20 fruits). A table shows the rate of increase during different periods.

1813. BÖHNING, R. H.

Time course of photosynthesis in apple leaves exposed to continuous illumination.

Plant Physiol., 1949, 24: 222-40, bibl. 24, illus.

The aim of this investigation was to get an indication of the maximum length of time that photosynthesis could be maintained in an apple leaf if light were a continuous factor and all other factors were both adequate and constant. This was shown to depend on the intensity of illumination and on the previous history of the leaves. In "sun" leaves, i.e. leaves left out of doors at all times except during the course of experiments, the measurement remained constant for at least 18 days under 3,200 f.c. illumination; under 5,800 f.c., however, the rate gradually decreased. Exposure of "shade" leaves, i.e. leaves developed under the low light intensity prevailing in the greenhouse, to continuous illumination of even relatively low light intensities resulted in bleaching of the chlorophyll and final cessation of photosynthesis.—Ohio State University, Columbus.

1814. LOEWEL, E. L., and BRUHN, H.

Der Zeitpunkt der Blüte im Laufe der letzten 15 Jahre. (Dates of flowering during the past 15 years.)

Mitt. Obstversuchsr. Jork, 1949, pp. 37-8.

Peak dates of cherry blossoming are recorded over a period of 15 years. Yearly temperature sums, recorded for the last 10 years, from 1 January to the peak of blossoming, range from 334 to 536° C. The relationship between date of flowering and temperature sum appears to be remote.

1815. CELJNIKER, JU. L.

The physiological differentiation of apple flower buds. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 66: 281-4.

In an attempt to distinguish potential leaf and fruit buds in very early stages of development, the author adopted a method of determining the isoelectric point of the meristematic tissues of apple buds, and concluded that a difference between the two kinds of bud could be detected 3 to 6 weeks before morphological differentiation occurred. The isoelectric point of the flower buds is of a lower pH than that of the leaf buds.

1816. SPIVAKOVSKIĬ, N. D.

The effect of the form of nitrogen on the growth of apple trees and the initiation of the fruit buds. [Russian.]

Doklady vsesojuz. Akad. sel'sk. Nauk S.S.S.R., 1949, No. 2, pp. 25-8.

The experiments described were carried out on one-year-old apple trees of Saffron Pippin grafted on crab rootstocks, grown in leached black soil in wooden tubs. It was found that the different forms of nitrogen supplied had different effects on tree development. Ammoniacal nitrogen (as ammonium sulphate) induced more vigorous growth of shoots in the second half of summer than did nitrate nitrogen. The initiation of fruit buds on the two-year-old wood was more pronounced following the application of nitrate than that of ammoniacal nitrogen. Ammonium nitrate was intermediate in its action, though rather nearer to that of nitrate nitrogen. The apical leaves of shoots of trees receiving ammoniacal nitrogen contained more saccharose than those on trees receiving nitrate. The phosphorus and potassium content of leaves was highest on trees receiving nitrate nitrogen.

Manuring and other cultural operations.

(See also 1706-1712, 2319r.)

1817. STALÉ, —, AND OTHERS.

La fertilisation des arbres fruitiers. (Manuring fruit trees.)

Fruit belge, 1949, 17: 57-96.

This article consists of six reports presented at a meeting of the [Belgian] "Ligue Pomologique", held 7 March, 1949. The reports concern:—the chief elements necessary to arboriculture, minor elements and fruit growing, soil: fertilizer relations, application of manures to fruit trees, practical conclusions for the Belgian fruitgrower, results of the fruit manurial trials of the Ligue Pomologique.

1818. TARASENKO, M. P.

Manuring fruit trees at the time of planting. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 11-13.

The author advises mixing manures with the soil of the holes in which fruit trees are planted, at the rate of 14-15 g. N, P, and K for a hole 120×55 cm. or, if dung is used, 6-8 kg. per hole. Higher quantities of minerals are to be avoided or injury may be caused in dry summers.

1819. MULDER, D.

Het gebruik van kunstmeststoffen in der fruitteelt. (The use of artificial manures in fruit growing.)

Meded. Dir. Tuinb., 1949, 12: 189-91.

The author first discusses the relation between soil condition and leaf symptoms of deficiency diseases, then goes on to describe types of soil in Holland and their mineral requirements for fruit growing.

1820. ROGERS, W. S., AND GREENHAM, D. W. P.

Soil management, with special reference to fruit plantations.

J. roy. agric. Soc., 1948, 109: 194-211, bibl. 35.

The following recommendations for good fruit soils

in south eastern England are based on experimental results obtained at East Malling and on American work; they are intended for apples but should be applicable also to pears and plums: "The trees should be planted in a well-cultivated soil, and a system of clean cultivation with autumn and winter cover should then be practised for the first 5 years. The cover should consist of an oats and tares cover crop or, failing that, at least natural weeds should be allowed to grow from August until March. At the age of 5 years, when the trees would normally be brought into cropping, grassing down [with a specified seed mixture] is recommended. The sward must be kept short by frequent gangmowing, and the application of about 5 cwt./acre sulphate of ammonia will be necessary. An alternative treatment after the first 5 years is to allow a natural sward to develop. . . . If a thin sowing of legumes, such as 1 to 4 lb. wild white clover is made, at the time when cultivation stops, a sward consisting of natural grasses and clovers will become established. In either case, the ground should be well levelled before letting the sward develop, so the mowing will be easy."

1821. ROGERS, W. S., AND GREENHAM, D. W. P.
Maintaining orchard fertility.
Fruitgrower, 1948, 106: 701-3.

The authors' summary of a paper read at the Top-fruit Conference, Maidstone, in November, 1948, mainly concerned with the use of cover crops in orchards for maintaining fertility.—East Malling Res. Stat., Kent.

1822. WIERSZYLLOWSKI, J., AND KOTAR, S.
Wyniki badań gleboznawczych w sadach powiatów Blonie i Sochaczew. (Soil investigations in orchards.) [English summary ½ p.]
Przegląd Doświadczalnictwa rolniczego Poznań, 1947, 3: 175-89.

The soil conditions of the districts in Poland considered suitable for fruit growing are discussed. Generally the best areas are those at relatively high levels with good natural drainage, a high water level, and good subsoil. Proper care and manuring may, to some extent, overcome unfavourable soil conditions. The chief difficulties are unfavourable water levels, entailing drainage.

1823. KEMP, W. S.
Importance of soil drainage in orchards.
N.Z. J. Agric., 1949, 78: 247-50, bibl. 2, illus.

Orchard drains and their construction are described. The author's recommendations are, plan the whole system before starting operations, obtain maximum efficiency throughout the life of the system by attention to detail, and prepare and keep an accurate plan of the whole system.

1824. PEIKERT, F. W., AND TRIBBLE, R. T.
The effect of irrigation on the humidity in orchards.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 31: 266-9.

The data presented were collected in a mature apple orchard with heavy sod cover in order to obtain evidence on the question whether a rise in humidity resulting from sprinkler irrigation might favour the

spread of fungus diseases. Tables and diagrams indicate that the humidity increased only within the area approximately covered by the sprinklers and that it returned to normal in the space of an hour. Within 45 minutes after irrigation the foliage on the trees was completely dry, but some drops of water still remained on the fruit.

1825. EGBERTS, H.
Het gebruik van springstoffen ten dienste van de fruitteelt. (The use of explosives in the orchard.)
Fruitteelt, 1949, 39: 289-91, illus.

A discussion on the use of explosives in orchards with particular reference to the breaking-up of hard subsoils to allow increased translocation of water and the penetration of roots to lower levels.

1826. JAIVENOIS, A.
Emploi des explosifs agricoles en cultures fruitières. (The use of agricultural explosives in fruit growing.)
Fruit belge, 1949, 17: 107-9, illus.

An account of trials in the province of Hainaut (Belgium) in which explosives were used for uprooting fruit trees. For small trees (up to 10 cm. in diameter) one 100 g. cartridge, for large trees (30 to 35 cm. in diameter) two cartridges were used.

1827. JAIVENOIS, A.
Le buisson: conceptions actuelles de formation. (The bush fruit tree: modern ideas as to its shape.)
Fruit belge, 1949, 17: 27-30, illus.

After describing the qualities required of a bush fruit tree the author gives an account of the modifications that have been adopted or tried in England, Switzerland, Germany and Holland.

1828. EFENDIEV, M. M.
How to hasten fruit production in fruit trees. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 16-18.

An experiment is described in which apple trees [age not stated] were treated, to bring them quickly into bearing, as follows: (1) branches curved down with their ends tied to the stem, (2) branches bound round with wire under which was placed strips of tin or sacking, (3) trees hard pruned, (4) control trees, untreated. The operations were carried out in the spring of 1947. In the following spring the trees with branches bent and those bound with wire came into flower, but the rest of the trees in the orchard did not blossom [actually figures for yields show that controls and some of the pruned trees bore small crops]. After flowering in May the treated trees were untied. The largest crops were on the trees with branches curved downwards, and moderate crops on those bound with wire. The author prefers binding the branches to tying down their ends as requiring less labour and not causing any permanent injury to the trees.

1829. VAN STUIVENBERG, J. H. M.
Chemische bloemdunning bij appels en peren. (Blossom-thinning sprays for apples and pears.) [English summary 10 ll.]
Meded. Dir. Tuinb., 1949, 12: 177-87, bibl. 9.

The American work on blossom-thinning sprays is reviewed. It is concluded from trials in the Kesteren area, Holland, that Krenite (a sodium salt of DNC) in concentrations between 0.125 and 0.25% caused noticeable thinning, but that a solution of 0.5% damaged the leaves and killed all the flowers. The warning is given that the method is not yet ripe for general recommendation.

1830. FEARS, W. P.

Pre-harvest drop of apples and pears.

J. Agric. W. Aust., 1948, 25: 348.

A note on satisfactory results in reducing pre-harvest drop of Jonathan and Delicious apples and of Bartlett pears. In the Bartlett pear orchard an average of between 12 and 13 pears was lost per tree from trees sprayed with growth substances as against 250-300 fruits per tree from those unsprayed, the additional fruit retained on sprayed trees being about two cases per tree.

1831. DE ALMEIDA, C. R. M.

I fitormoni nella lotta contro la cascola delle olive. (The use of phytohormones to prevent the fall of olives.) [French and English summaries.]

Reprinted from *Olearia*, January, 1949, pp. 4, bibl. 2.

Using Edgerton's method [described in *Proc. Amer. Soc. hort. Sci.*, 49: 42-4, noted *H.A.*, 18: 132], the author succeeded in preventing both leaf fall and fruit fall of olives with sodium α -naphthylacetate, 2,4-dichloro-phenoxyacetate of sodium and mixtures thereof. The second named is the more economical and deserves further study. The trials were made on branches of trees in the Agricultural Institute at Lisbon.

Harvesting.

1832. MILLIMAN, L. H.

Mechanization of [fruit] harvesting.

Bett. Fr., 1949, 43: 12: 7, 12, illus.

An illustrated description of the "orchard monkey" developed by a Californian grower, H. A. Brock. "Essentially two hydraulically operated extensible booms with automatically self-levelling platforms which can be swung in any direction in a 225 degree arc, the Orchard Monkey will handle plantings ranging from 16 to 40 foot spacings. The platforms can be hoisted to a height of 20 feet, and horizontally they have a 35-foot spread." A 9 horsepower air-cooled engine provides the hydraulic pressure and the electricity for the controls.

1833. REYNEKE, J., AND VAN NIEKERK, P. E. LE R.

When should fruit be picked? Test for determining the picking stage of fruit.

Fmg S. Afr., 1949, 24: 181-4, 185-7, 189, illus.

In the first article the authors point out that few South African growers seem to be aware of the losses involved through picking fruit when too immature. An inspection at the docks showed that 78% of Bon Chrétien pears for export had been picked too green. The following aspects of the problem are discussed:

the relationship between size and weight of the fruit and the stage of ripeness when picked, capacity of the fruit for ripening normally after transport or cooling, flavour and colour. While the change in the basic colour (green) is an indication of the stage of development of the fruit, the development of the blush, or red colour, is no reliable criterion, since it is principally influenced by light and moisture content. The second article gives simple, practical tests for determining the correct stage at which to pick apples, pears, peaches, plums, and grapes in South Africa.

1834. NAJJAR, H.

The handling of the olive crop and its effect on the quality of the oil. [Arabic, English summary $\frac{1}{2}$ p.]

Circ. Ext. Serv. Minist. Agric. Damascus 33, 1948, pp. 11.

Harvesting early and storing the crop in deep vats and thus exposing it to moulds and ferments tends to raise the acidity of olive oil. Completely ripe olives, moreover, give considerably more oil than prematurely picked olives.

Noted.

1835.

a. ANDERSON, E. J.

Hive humidity and its effect upon wintering of bees.

J. econ. Ent., 1948, 41: 608-16.

b. BERGFELDT, G.

Fruktodlingen i Jönköpings län. (Fruit-growing in the Swedish county of Jönköping.) *Sverig. pomol. Fören. Årsskr.*, 1948, 49: 57-63.

c. BURNSIDE, C. F., AND REVELL, I. L.

Observations on Nosema disease of honey bees.

J. econ. Ent., 1948, 41: 603-7, bibl. 7.

d. DAVIS, M. B.

Fruit production problems in Canada.

Proc. 62nd Conv. Amer. pomol. Soc., 1948, pp. 131-40, being *Contr. Div. Hort., Central Exp. Farm, Ottawa*, 683.

e. DEBOR, H. W.

Besonderheiten im Mittelgebirgsobstbau. (Fruit growing in the hills of central, southern and south-western Germany.) *Ceres, Hamburg*, 1949, 2: 3: 11-12.

f. FLORY, W. S., Jr.

The peach variety situation in Virginia.

Fruit Var. hort. Dig., 1948, 3: 3-6, 70% Elberta.

g. GARY, N. D., NELSON, C. I., AND MUNRO, J. A.

Serological evidence of resistance of [bee] larvae and workers to *Bacillus larvae*.

J. econ. Ent., 1948, 41: 661-3, bibl. 6.

h. HIRST, E. L., AND OTHERS.

Pear cell-wall cellulose.

J. chem. Soc. Lond., 1949, suppl. Issue 1, pp. S182-4.

- i JUDKINS, W. P.
The Stoner peach.
Fruit Var. hort. Dig., 1949, 4: 46.
- j LJONES, B.
Om plantehormon som hindrar fruktfall.
(Plant hormones for the prevention of fruit drop.)
Frukt og Baer, 1949, 2: 48-58, bibl. 7.
- k LJONES, B.
Forsøk med sprøyting mot fruktfall.
(Spraying trials for the control of pre-harvest drop in apples.)
Norsk Hagetid., 1949, 65: 92-3, being *Meld. Norg. LandbrHøgsk.* 9 (preliminary communication).
Not varieties grown in England.
- l LØKEN, A.
Insekter som har verdi for pollineringa i frukthagen. (Pollination insects of fruit.)
Frukt og Baer, 1949, 2: 65-71, bibl. 2.
- m MORRISON, E. M.
Costs and returns from peach production. Selected areas, Utah, 1947.
Bull. Utah agric. Exp. Stat. 334, 1948, pp. 28.
- n NILSSON, F.
Några intryck av frukt- och bärodling i Finland. (Impressions of top and soft fruit growing in Finland.)
Sverig. pomol. Fören. Årsskr., 1948, 49: 132-8.
- o SCHANDERL, H.
Die Entwicklungsgeschichte des Embryos bei den Rosaceengattungen. (The development of the embryo in the genera *Prunus*, *Pirus* and *Malus*.)
Züchter, 1949, 19: 206-10, bibl. 4, illus.
- p THOMAS, P. H.
History of the Tasmanian fruit industry.
Fruit World, Melbourne, 1949, 50: 1: 9-10.
- q THORSRUD, J.
Annahvertårs-baering hos eple. (Biennial bearing in apple.)
Frukt og Baer, 1949, 2: 5-13, bibl. 16, illus.
A review of the literature.
- r ZIELINSKI, Q.
Peach and nectarine varieties in Oregon.
Fruit Var. hort. Dig., 1948, 3: 15-18.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(See also 1752, 1753, 1771, 2319r, 2585, 2621.)

1836. KROKAN, O.
Dyrking av baervekster i Trøndelag.
(Small fruit growing in Trøndelag, Norway.)
Frukt og Baer, 1949, 2: 35-47.
- Requirements, varieties and cultivation of berry fruits in the Norwegian counties of South and North Trøndelag.
1837. BEAR, E. M.
Straw mulches for soft fruit.
Grower, 1949, 31: 692-3, illus.
- A close planting system for currants and gooseberries may be used, and cultivation dispensed with altogether, if a straw mulch is applied to smother the weeds. Costs are considerably reduced in this way. Details of the costs, culture and results are recorded from a Sussex fruit farm.
1838. EATON, E. L., AND OTHERS.
The blueberry.
Publ. Canada Dep. Agric. 754, revised 1949, pp. 34, bibl. 16, illus., being *Fmrs' Bull.* 120.
- A revised edition of the bulletin published in 1943 [see *H.A.*, 14: 532] dealing with all aspects of blueberry culture in Canada. The section on culture and propagation by E. L. Eaton contains a simplified and more accurate classification of the species based on the work of Camp. This edition also includes an up-to-date list of varieties, an additional note on picking and a revised account of propagation. To the section on insect pests and their control, by C. W. Maxwell and A. D. Pickett, a note has been added on the black army cutworm, serious outbreaks of which occur

periodically, and the blueberry flea beetle which caused extensive damage in 1947. 3% DDT will control both these pests. In the section on diseases by J. F. Hockey, twig blight, stunt and canker are new to the bulletin.

1839. HITZ, C. W.
Increasing plant stand in blueberry fields.
Bull. Me agric. Exp. Stat. 467, 1949, pp. 27, bibl. 12, illus.
- The purpose of the studies reported was to find methods of propagating low bush blueberries (*Vaccinium angustifolium*) and increasing their stand under field conditions without nursery facilities. Many of the results are preliminary, but will serve as a guide for further work. It was found that rhizome cuttings provide very good propagating material if growth substances are used to encourage rooting, and if the polarity of the cutting is recognized. When the entire cutting or tip of the rhizome is treated, shoot growth is inhibited, but treatment of the basal end only will encourage rooting without inhibition of uprights. The effect of length and diameter of cuttings, growing medium, moisture level, and the rest requirement of rhizomes were investigated. A method described for transplanting blueberry sods by means of a golf hole cutter is useful for filling gaps. A root stimulant and a starter solution did not increase the rate of growth or percentage of take of such transplants. Cutting the rhizomes results in considerable increase in new upright stems, underground spread and rooting. Disc-harrowing was therefore tried as a method of increasing the plant stand in a thinly covered field, but it resulted in more damage to the old plants than was compensated for by the new growth produced. The development of a disc especially designed for the purpose is suggested.

1840. BLUEBERRY INDUSTRY ADVISORY COMMITTEE.

Blueberry research and service.

Misc. Publ. Me agric. Exp. Stat. 614, 1949, pp. 16, illus.

A brief progress report, covering work on the following subjects: *Blueberry fruitfly*. A mixture of 50-10-40 calcium arsenate, mono-hydrated copper sulphate and hydrated lime, at the rate of 4-6 lb. per acre, is preferable to calcium arsenate alone for fruitfly control, as less injury is caused to the plants. *Black army cutworm and flea beetle* can be controlled by an early application of 5% DDT at the rate of 10-20 lb. per acre. *Thrips*. The life history of blueberry thrips has been worked out. DDT and chlordane gave most promising control results, but commercial recommendations cannot yet be made. *Fertilizer studies* with major and minor elements. *Weed control* studies showed that the triethanolamine salt of 2,4-D caused least injury to blueberry plants. The range of species killed by this herbicide was determined. Better commercial weed control equipment is being developed. *Twig blight and leaf rust* are controlled more successfully by the standard 20-20-60 dust of calcium arsenate, mono-hydrated copper sulphate and hydrated lime, than by any other copper dust tried. It is best applied at blossom-fall and 10-14 days after fruit set. *Processing blueberries*. The possibility of obtaining a firmer pack, and equipment for the stemming of blueberries is being investigated.

1841. WATT, J. H.

Gooseberry culture [in New Zealand].

Bull. N.Z. Dep. Agric. 297, revised 1948, pp. 16, illus.

Notes for commercial growers on culture, varieties and diseases. The most important area of production is in the Wairarapa, where strong winds make it necessary to plant windbreaks. A double row of Lombardy poplars has proved the best protection. There is no commercial demand for dessert gooseberries in New Zealand, and the best market is obtained by early maturing varieties. As silver leaf (*Stereum purpureum*) is the most serious disease of gooseberries in the country, it is understandable that lack of efficient disease control is an important factor limiting production.

1842. KUPKE, W.

Verkürzte Beerenobstanzzucht. (Quicker raising of gooseberries and currants.)
Gartenwelt, 1949, Hft. 10, p. 158.

In August/September cuttings are set out at 15 cm. apart with 70 cm. between rows. Callus formation and root development occur after a short time, resulting in good growth in spring. In autumn the plants are cut back almost to soil level to produce vigorous growth in the second spring. This method reduces the time necessary to raise saleable plants from 3 to 2 years. It is noted that frost lifts the rooted cuttings and that the soil needs treading on the onset of thaw.
O.J.

1843. YEAGER, A. F.

New development in raspberries.

Fruit Var. hort. Dig., 1949, 4: 4-6, illus.

Two lines of approach are being followed by the New

Hampshire Experiment Station, Durham, in an attempt to produce a raspberry variety adapted to the severe winter conditions of that State. (1) The development of an autumn-bearing variety that would produce fruit on new wood, yet crop early enough to avoid autumn frosts, would overcome the problems both of winter injury and spur blight. The variety Durham (Taylor raspberry × nectarberry) shows promise for this purpose. (2) The development of a low-growing variety that in normal New Hampshire conditions would be below the snow level in winter. A productive, early-fruiting raspberry, 18-24 inches high, has been selected for this purpose from the progeny of a raspberry and *Rubus chamaemorus*-(bakeberry or cloudberry) hybrid.

1844. STATENS FORSGSVIRKSOMHED I PLANTEKULTUR.

Sortsforsøg med hindbaer 1938-48. (Variety trials with raspberries 1938-48.)

Erhvervsfrugtaavl., 1949, 15: 241-4.

Yield and other data, obtained in variety trials at three Danish research stations, are presented for Preussen, Lloyd George, Spangsbjerg 140, Spangsbjerg 8 and other raspberry varieties. The two Spangsbjerg varieties did not yield quite so heavily as Preussen, but they show promise for freezing and juice production. Preussen is the most widely grown raspberry in Denmark, both commercially and in private gardens.

1845. SLATE, G. L.

Breeding autumn-fruiting raspberries.

Fruit Var. hort. Dig., 1949, 4: 10-12.

A note on the work done at the New York agric. Exp. Stat., Geneva, on the breeding of autumn fruiting raspberries, and an outline of its future programme. The variety September (Marcy × Ranere) is so far the only good quality raspberry produced that will ripen a crop early enough to escape autumn frosts. Indian Summer (Lloyd George × N.Y. 1950) is of some value where the growing season is longer than at Geneva.

1846. FOLLEY, R. R. W.

Can the strawberry succeed [in England]?

Fm Econ., 1949, 6: 48-50.

A very readable survey of the growth and decline of the strawberry industry in England and a cautious assessment of prospects for a post-war revival.

1847. BANGA, O., AND KRONENBERG, H. G.

Teelt en veredeling van aardbeien in België. (The cultivation and breeding of strawberries in Belgium.)

Meded. Dir. Tuinb., 1949, 12: 317-35, bibl. 4, illus.

A report on observations made towards the end of May, 1947, during a study journey in Belgium, with particular reference to the pot culture of strawberries, for forcing under glass, at Duffel. Other places visited were Wépion, Huy and Tihange. Notes are given on the chief varieties grown.

1848. HAYTER, C. N.

Strawberry growing [in S. Rhodesia].

Rhod. agric. J., 1949, 46: 111-18, illus.

Strawberries can be grown successfully in most parts of the country where the soil is fertile and a plentiful supply of water is available in the dry season. The

best results are obtained by making new beds each year and treating the plants as annuals. Practical advice is given on soil, site, preparation of land, planting, cultivation, mulching, harvesting, propagation, pests and diseases. The selections known as Vumba and Salisbury, both self-pollinating, do well. They crop regularly for 3 to 4 months at 3,500 to 4,000 ft. above sea level. At 5,000 ft. the fruiting season is from September to December. Yields of 1,500 to 3,000 lb. per acre can be expected.

1849. DARROW, G. M., AND WALDO, G. F.
Strawberry culture: Western United States.
Fmrs' Bull. U.S. Dep. Agric. 1027, revised 1948, pp. 26, illus.

This bulletin applies to those regions in the Western United States where ordinary farm crops are grown with irrigation, and also to western Oregon and Washington where irrigation is not essential but may be profitable. The practices followed in strawberry growing in the semi-arid parts of the west are quite different from those in the Eastern States. For instance, the need for irrigation affects methods of soil preparation and choice of planting and training systems; choice of varieties is limited; and in California it is necessary to import from Eastern States stocks that have undergone a cool, dormant period. The principles of irrigating strawberries are essentially the same as those for other crops, but strawberries are sensitive to the alkali salts that irrigation brings to the surface, and these must be washed out or skimmed off. The methods of culture practised in the commercial strawberry growing districts of the west are described, including the culture of strawberries as an intercrop in orchards and vineyards. Suitable varieties are recommended for each district.

1850. CHRIST, E. G.
Strawberry growing in New Jersey.
Ext. Bull. N.J. Coll. Agric. 253, 1949, pp. 16, illus.

A detailed account of culture, costs of production, locally grown varieties and methods of packing and grading, written for the benefit of the commercial grower. In New Jersey strawberries are generally grown as a 2-year crop, producing runners in the first year to form a matted row, and fruiting the second year. Only where vigorous renovation practices are applied, including ploughing up of the parent plants, are plantations maintained for a third and fourth season. Overhead irrigation has been successfully used in recent years to prevent frost damage to open blossoms. The water is turned on as soon as the temperature drops to freezing point, and is left on until all ice is melted the next morning.

1851. CHRIST, E. G.
Strawberry varieties in New Jersey.
Fruit Var. hort. Dig., 1948, 3: 66-70, illus.

An estimate based on field observations of the commercial qualities and status of strawberry varieties grown in New Jersey. Lupton, Blakemore, Sparkle, Premier, Catskill and Fairfax cover the greatest acreage, but many new varieties have recently been introduced by the N.J. Agricultural Experiment Station and the U.S. Department of Agriculture, some of which are gradually replacing the old.

1852. STATENS FORSØGSGVIRKSOMHED FOR PLANTEKULTUR.
 Forsøg med Jordbaersorter 1945-47.
 (Strawberry variety trials 1945-47.)
Tidsskr. Planteavl, 1949 (?), 52: 559-62, being *Meddel. Statens Forsøgsvirks. Plante-kult.* 411.

Spangsbjerg varieties, some as yet unnamed, are compared with two standard varieties. The trials were carried out at Virum, Blangsted, Spangsbjerg and Hornum research stations.

1853. ANON.
Seedling to oust Madame Lefebvre ?
Fruitgrower, 1949, 107: 654.

A new strawberry variety, raised by a grower in the Tamar Valley from a chance seedling, has shown resistance to red core disease for the last 10 years. It crops earlier than Madame Lefebvre, and the flavour is said to equal that of Royal Sovereign.

1854. CULLINAN, F. P., AND KEMP, W. B.
Fairland—a new early, red-stele resistant, strawberry.
Fruit Var. hort. Dig., 1948, 3: 19.

The new strawberry, a cross between Aberdeen and Fairfax, is best adapted to the region where Howard 17 (Premier) is an important variety. It ripens 2-6 days after Blakemore.

Vines.

(See also 1771, 1774, 2459, 2605, 2621, 2632.)

1855. OFFICE INTERNATIONAL DU VIN.
 IIIe Congrès International du Raisin, du Jus de Raisin et du Vin. (The proceedings of the third international vine, grape juice and wine congress.)
Bull. Off. int. Vin, 1947, 20: 200: 11-102, 201: 4-108, 202: 15-198; 1948, 21: 203: 28-169, 204: 5-127, 205: 1-75.

The proceedings of the third international vine, grape juice and wine congress, held at Istanbul 2-6 October, 1947, are fully reported in six numbers of the journal. Papers read cover all aspects of viticulture in individual vine growing countries.

1856. OFFICE INTERNATIONAL DU VIN.
 XXVIIe Session Officielle Plénière du Comité de L'O.I.V. (27th plenary meeting of the International Wine Office.)
Bull. Off. int. Vin, 1948, 21: 207: 3-125, 208: 3-45, 209: 3-59, 210: 3-104, 211: 3-46, 212: 3-30, 213: 3-17.

The 27th plenary meeting of the Office International du Vin was held in Paris on 20-22 July, 1948. The papers read cover a multitude of viticultural and oenological problems, and the report is a valuable source of information on vine growing in different countries and on many questions common to world viticulture.

1857. WINKLER, A. J.
Grapes and wine.
Econ. Bot., 1949, 3: 46-70, illus.

A description of vine production methods, with special reference to the Californian industry, and of the qualities desirable in wine, raisin, table, sweet juice

and canning grapes, is followed by a popular account of wine types and wine production.

1858. MATHIEU-REVERDY, G.
Contribution à l'étude du sol, de la vigne et du vin dans le Sud-Ouest. (Soils, vines and wines in the south-east of France.)

Ann. agron. Paris, 1949, 19: 166-83, bibl. 7.

A study of vine growing in south-eastern France, dealing with geography, climate, geology, topography, soils, rootstocks, varieties and types of wine produced—with the emphasis on soils.

1859. SOBOLEV, N. K.
Viticulture on the collective farms of the Crimea. [Russian.]
Vinodelie i vinogradarstvo (Wine-making and viticulture), 1949, No. 2, pp. 37-9, illus.

The author discusses the rehabilitation and extension of vineyards in the Crimea, with particular reference to extending viticulture to the more northern steppe and foothill regions. Advice is given on setting out and planting the vines.

1860. TUPIKOV, M. A.
Micurin's methods in viticulture. [Russian.]
Vinodelie i vinogradarstvo (Wine-making and viticulture), 1949, No. 2, pp. 7-14, illus.

The author criticizes two [imaginary] horticultural axioms, viz. (1) The more vigorous the growth of a bush, the poorer the yield, and (2) The greater the yield, the lower the quality; and goes on to explain that with rational treatment they do not hold good in Russian viticulture. Particular attention is given, with diagrams, to improved methods of training and pruning.

1861. HUSEFELD, —.
La sélection de la vigne. (Vine breeding.)
Bull. Off. int. Vin, 1948, 21: 212: 40-4.

A short review of the promising work at Müncheberg, Germany, carried out primarily to produce mildew-resistant quality vines.

1862. SIMONOV, I. N.
Using pollen mixtures in grapevine breeding by Micurin's method. [Russian.]
Vinodelie i vinogradarstvo (Wine-making and viticulture), 1949, No. 4, pp. 37-9.

When a mixture of pollen from two or three vine varieties was used in pollinating another variety, fruit set was greater than when the pollen of one variety only was used. Small bits of the stigmas of the pollinating plant, when placed on the stigmas of flowers of another variety, also had a stimulating effect on fruit set.

1863. SOUSA, L. O. M. DA COSTA E.
Observações sobre a auto-fecundação na *Vitis vinifera* L. (Self-fertilization in *Vitis vinifera*.) [English summary 1 p.]
An. Inst. sup. Agron. Lisboa, 1943, 14: 221-35, bibl. 10, illus. [received 1949].

The results of self-pollination are compared with those of open pollination in several varieties of table grape. Varieties which are economically infertile when selfed, and others which showed, when self-pollinated, results

identical with those from open pollination, are mentioned.

1864. SOUSA, L. O. M. DA COSTA E.
O desavinho e a bagoinha têm origem diferente quanto à fecundação? (Non-setting and millerandage not connected with fertilization.) [English summary ½ p.]
An. Inst. sup. Agron. Lisboa, 1943, 14: 211-19, bibl. 10, illus.

The author criticizes the statement that non-setting and millerandage in the grapevine are due to lack of, or to deficient, pollination. He shows the possibility of incipient parthenocarpic development of the berry without the stimulation of pollination, not only in the seedless varieties but also in some varieties where the berries reach normal size only when they contain viable seeds. He points out the importance of the knowledge that varieties which bear normal fruit may also be able to produce parthenocarpic berries, and discusses methods of obtaining such parthenocarpic grapes.

1865. ZIELINSKI, Q. B.
Grape variety situation in Oregon and evaluation of recently introduced varieties.
Fruit Var. hort. Dig., 1949, 4: 15-22, illus.

The principal varieties of both American (*Vitis labrusca*) and European (*V. vinifera*) grape vines grown in Oregon are described, and the data obtained in a test of recent and standard varieties under Oregon conditions are tabulated.

1866. OBERLE, G. D.
Composition of juice of French hybrid grapes grown in New York.
Fruit Var. hort. Dig., 1949, 4: 47-51, bibl. 6, being *J. Pap. N. Y. St. agric. Exp. Stat.* 774.

Data are presented for the analysis of the grape juice of 38 French hybrid vine varieties, tested at Geneva, N.Y., from 1943 to 1947. While most of the varieties are unsatisfactory under the conditions of New York State, some offer promise, especially as a source of high quality red wine.

1867. FRY, B. O., AND MURPHY, M. M.
Muscadine grapes in Georgia.
Fruit Var. hort. Dig., 1948, 3: 99-101, illus.

The muscadine grape, *Vitis rotundifolia*, is grown commercially only in a few States on the Atlantic and Gulf coasts of America. The recent introduction of improved varieties may make it an important crop in this area. In 1946 the American Society of Horticultural Science investigated the commercial value of the numerous varieties grown, and found only about 20 worthy of recommendation. The merits of 11 of these are discussed.

1868. ROBINSON, W. B., AVENS, A. W., AND KERTESZ, Z. I.
The chemical composition of ripe Concord-type grapes grown in New York in 1947.
Tech. Bull. N. Y. St. agric. Exp. Stat. 285, 1949, pp. 16, bibl. 8.

Numerous samples of grapes from the three major grape-producing areas in New York State were analysed for ash (average determined in seeded grapes 0.46%), P_2O_5 (34.4 mg. per 100 g.), K_2O (248 mg. per 100 g.), soluble solids (16.36%), acidity, i.e. pH (2.92), total

acid, as tartaric (1·29%) and water-insoluble solids (1·66%). The mineral constituents of grapes from one region only tended to increase as harvesting progressed. Commercial processing was found to result in a very varying decrease in insoluble solids and a slight decrease in P_2O_5 . Other constituents were but little affected.

1869. GUKASOV, A. I.

Ways of increasing the fruitfulness of the variety Tavriz. [Russian.]

Vinodelie i vinogradarstvo (Winemaking and viticulture), 1949, No. 3, pp. 11-14, illus.

Tavriz, one of the best table varieties of grape grown in the Azerbaijan Socialist Soviet Republic, is renowned throughout the vine-growing regions of the U.S.S.R. for its fine flavour, good appearance, and its transport and storage qualities. It is vigorous but its yield is regarded as rather mediocre and it has a tendency to irregular bearing. The author considers that its disadvantages can be obviated by improved cultural methods particularly with regard to pruning and training. Data are presented for different methods of training, good results being obtained with the cordon method of the Azerbaijan zonal research station.

1870. BERNON, G.

La production des raisins de table. (The production of table grapes.)

Prog. agric. vitic., 1949, 131: 106-9.

France produces 150,000 metric tons of table grapes a year. This figure is compared with those for other European countries and the U.S.A. Nearly all the table grapes produced in France are consumed in that country, and measures are discussed for increasing their export.

1871. NEGRULJ, A. M.

The development of table grape growing in U.S.S.R. [Russian.]

Vinodelie i vinogradarstvo (Winemaking and viticulture), 1949, No. 4, pp. 19-26, illus.

An account is given of the cultivation of table grapes in Russia in relation to the chief grape-growing regions and varieties grown. Its extension in other regions is discussed. A table shows the summation of temperatures of certain regions with the approximate dates of ripening of early, mid-season, and late varieties, and the time when autumn frost may be expected.

1872. ALEXA, G., AND SIMIONESCU, C.

Considerations sur l'huile de pepins de raisins. (Grape seed oil.)

Bull. Inst. poly. Jassy, 1948, 3: 819-23, bibl. 10.

Analyses of the physical properties of oil obtained from grape seeds indicate that this oil could well be used for edible purposes, and would be of particular value in the varnishing industry.—L'Institut Polytechnique de Jassy, Roumania.

1873. SOUSA, L. O. M. DA COSTA E, AND REZENDE, A. V. G. DA S.

Técnica para a colagem dos cortes antes da coloração no método de inclusão em celoidina. (A method of fixing stained sections to slides when using celloidin for embedding.) [English summary ½ p.]

An. Inst. sup. Agron. Lisboa, 1943, 14: 145-9, bibl. 2 [received 1949].

A description of a staining method used in an anatomical study of the stock-scion union in grafted vines.

1874. HARMON, F. N., AND SNYDER, E.

Some factors affecting the success of green wood grafting of grapes.

Proc. Amer. Soc. hort. Sci., 1948, 52: 294-8, bibl. 1.

Details are given from California of a method of grafting vinifera vines in late spring and early summer which has yielded considerable success in New Zealand and elsewhere.

1875. NAUMENKO, N. P., AND MIŠURENKO, A. G.

The technique of stratifying vine grafts. [Russian.]

Vinodelie i vinogradarstvo (Winemaking and viticulture), 1949, No. 3, pp. 15-18.

The author describes a modified method of stratification of vine grafts that promotes callusing at the union with retarded development of the roots of the rootstock, an advantage being that the young plants are more easily manipulated at transplanting. The method is one which keeps the roots at a temperature lower than that at the union and around the scion; it involves the use of a layer of sawdust around the place of union.

1876. PEARSE, H. L.

Rooting of vine and plum cuttings as affected by nutrition of the parent plant and by treatment with phytohormones.

Sci. Bull. Dep. Agric. S. Afr. 249, 1946, pp. 13, bibl. 15 [received 1949].

Vines *V. vinifera* L. (var. Waltham Cross) and *V. labrusca* L. (var. Jaquez) and plum trees *P. cerasifera* × *P. munsoniana* (var. Marianna) were cultivated in sand cultures under differential nutritional treatments, and cuttings obtained from these plants were investigated for ease of rooting. (1) When vine plants receiving full nutrition were compared with plants starved for single nutrients as sources of cutting material, it was found that, if the percentage of cuttings rooting was taken as a criterion, the series studied fell in the following order from highest to lowest:—nitrogen deficient, full nutrient, potassium deficient, phosphorus deficient, magnesium deficient and calcium deficient. (2) The root formation of cuttings obtained from vine plants grown at five different levels of nitrogen and at two levels of phosphorus was studied. The number of cuttings rooting and the number of roots formed per cutting increased as the nitrogen level of the parent plant was reduced to a low level; further reduction resulted in poorer rooting. Decreasing the phosphorus supply was detrimental to rooting, but the effect of the nitrogen level was still apparent even at low phosphorus level. (3) The level of nitrogen and phosphorus supply to the mother plant was found to have a similar effect on the rooting of both softwood and hardwood plum cuttings (Marianna). With the hardwood cuttings, however, the percentage of cuttings rooting was not affected, but only the intensity of root formation. (4) Where cuttings rooted readily without treatment, hormone treatment usually resulted in increased root formation; but in the varieties studied the nutrition of the mother plant appeared to be more important than hormone treatment in determining root formation. [Author's summary.]—Western Province Fruit Research Station, Stellenbosch.

1877. FLEROV, A. F., AND KOVALENKO, E. I.
Raising young vines with vigorous root systems. [Russian.]

Vinodelie i vinogradarstvo (Winemaking and viticulture), 1949, No. 4, pp. 27-9, illus.

Records good results in treating cuttings of certain vine varieties, which usually root badly, with α -naphthaleneacetic acid and nicotinic acid at 100 p.p.m. for 48 hours.

1878. GLUHOV, I. G.

Green layers for replacements in vineyards. [Russian.]

Vinodelie i vinogradarstvo (Wine-making and viticulture), 1949, No. 2, p. 32.

Layering green shoots is recommended as a suitable method of replacement in the vineyard.

1879. CONSTANTINESCO, G.

Vides dans les vignes complétées par des racinés en pots. (Gaps in vineyards filled by planting potted vines.)

Bull. Off. int. Vin, 1949, 22: 219: 24-9, bibl. 4.

The author describes his method in great detail. One-year-old vines are cut back to one bud and 1 cm. of root and then potted. Transplanting to fill gaps may be carried out with equal success in young and old vineyards.

1880. FRANÇOT, P., AND MAURO, J.

Action des phytohormones sur la vigne. (The effect of phytohormones on vines.)

Bull. Off. int. Vin, 1948, 21: 214: 32-45, bibl. 9, illus.

Observations and trials showed the injury that may be caused to vines even by small amounts of plant hormone preparations. The use of hormone dusts in areas adjacent to vineyards should be prohibited. The reaction of vines to contact with 2,4-D is illustrated in 6 plates.

1881. S., R.

Tying material from the fibre of the sida plant. [Russian.]

Vinodelie i vinogradarstvo (Wine-making and viticulture), 1949, No. 2, pp. 33.

For binding and tying material in viticulture the fibre of the sida plant [*Sida rhombifolia*] is recommended as being cheaper than lime bast. The sida plant can be propagated by seeds and by root cuttings.

1882. BARJONA DE FREITAS, M. A. G.

Influence de la surface foliaire de la vigne sur le développement du raisin et sur la composition du moût. (The influence of vine leaf surface on grape development and juice composition.)

Bull. Off. int. Vin, 1948, 21: 203: 93-100, bibl. 2.

Grape size and sugar content are directly related to the ratio of leaf area per grape, while an inverse relationship exists between leaf surface and total acid content. If the leaf area per grape approaches or falls below about 8 cm.², the grapes are small and liable to shrivel. Fruit thinning reduced yields if the leaf area per grape exceeded about 15 cm.²-16 cm.²,

according to variety. The experiments were carried out at the Station National Agronomique, Portugal, with the varieties Joao de Santarém and Diagalves.

1883. SOUSA, L. O. M. DA COSTA E.

Sobre a intensidade da poda na videira quanto à produção e qualidade. (Pruning vines for quantity and quality of crop.)

An. Inst. sup. Agron. Lisboa, 1943, 14: 237-58, bibl. 17 [received 1949].

The principal types of pruning for vines are reviewed and the advantages of the cane with spur method are pointed out. Preliminary results are given in comparing spur pruning with the Guyot system on vines with the same number of eyes.

1884. MORETTI, A.

Effetti della mozzatura estiva dei germogli uviferi sulle viti da tavola e da vino. (The effects of tipping fruit bearing shoots of table and wine grapes in the Po valley.) [French and English summaries, 1 p. each.]

Riv. Fruttic., 1949, 11: 1-27, bibl. 6.

The author compared the results of the general custom of summer tipping vines whereby each vine is left with approximately 50 bunches, if a wine grape, or 30 if grown for table grapes, with results of not so pruning them. He finds that the practice which is commonly thought to effect a considerable saving in labour and spraying is, in fact, uneconomical and results in smaller and poorer quality crops. He recommends its abandonment.—Lab. vitic. Conegliano.

1885. TAVADZE, P. G.

Determining the vigour of development of the root system of vines from the amount of bleeding they show. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 64: 727-30, bibl. 4.

The relation between vigour of development of the root system of vines and the intensity of bleeding is shown. By ascertaining the amount of bleeding the differences in the root development according to cultural operations, and the relation between the increase of growth in the above-ground parts and the root systems can be determined. The method helps in determining the degree of pruning necessary for individual plants.

1886. SMITH, F. B.

Nutrition of the grapevine.

N.Z. J. Agric., 1949, 78: 465-7, illus.

An account of the functions of chemical elements in plant nutrition with special reference to the grapevine, together with notes on green manuring, and on the trace elements boron, zinc and iron.

1887. GILJIDIEV, S. A.

Fallows and virgin soils under non-irrigated viticulture. [Russian.]

Vinodelie i vinogradarstvo (Winemaking and viticulture), 1949, No. 3, pp. 18-20.

Fallow and virgin land with meadow or meadow-bog soil is common in Uzbekistan. Owing to its high water-table such soil may be used for viticulture with little or no irrigation. Root development of vines

is discussed in relation to the soils and their water-tables.

Nuts.

(See also 1751, 1770, 2621.)

1888. MATVEEV, M. I., AND OVČAROV, K. E.

The effect of adenin and nicotinic acid on the secondary growth of the Bokhara almond (*Amygdalus bucharica* Korsh.). [Russian.] *Doklady Akad. Nauk S.S.S.R.*, 1949, **65**: 373-6, bibl. 6.

The Bokhara almond habitually shows arrested growth towards the end of May or beginning of June, accompanied by leaf-fall in the second half of June. In the experiment described adenin and nicotinic acid were used to induce secondary growth on experimental trees from which all the leaves were removed early in July. Some of the trees were then sprayed with 0.01% nicotinic acid, others with 0.001% adenin, the rest being left untreated. The trees sprayed with nicotinic acid produced four times as many leaves as the control plants, and both treatments induced the development of secondary shoots.

1889. HORN, E.

Jellemző arányszámok mandulafajták elkülönítésére. (Numerical relationships as characteristics of almond varieties.) [German summary $\frac{1}{2}$ p.] *Bull. Fac. Hort. Budapest*, 1948, **12**: 217-24, bibl. 6.

The data presented (German sub-titles) indicate that the following relationships may be used for the identification of varieties and variety-groups: (1) The ratio of shell: kernel weight; (2) the ratio of kernel length: width: thickness, especially in the soft-shelled type. Shell weight was found to be an aid in distinguishing between the three groups of almond, but no characteristic values were obtained for kernel weight or kernel length, width and thickness. The study is being continued.

1890. LANZA, F.

Il castagno, valore del frutto e sua disinfezione. (Treatment of chestnuts prior to export.) *Ital. agric.*, 1949, **86**: 64-8, bibl. 3, illus.

A plea for the use of disinfectant vapours of such substances as carbon disulphide, ethylene oxide, methyl bromide for disinfection of chestnuts prior to export in preference to treatment with hot water. The aim is to kill the larvae of *Balaninus elephas* and *Carpocapsa splendana*. Actual technique is not described.

1891. ENZIE, J. V.

Pecans in New Mexico.

Fruit Var. hort. Dig., 1948, **3**: 95-7, illus.

90% of the commercial pecan acreage in New Mexico is concentrated in the Mesilla Valley. Because of the arid climate and isolation of the district there are no fungus diseases and only two important insect pests, the pecan aphid and the walnut aphid. A short account of the history of the industry is followed by a description and evaluation of the main varieties

grown. These include varieties recently introduced from other States and tested by the New Mexico Experiment Station.

1892. McDANIEL, J. C.

Selecting eastern black walnut varieties.

Fruit Var. hort. Dig., 1948, **3**: 77-9, illus.

The opinions of five testers of the Northern Nut Growers' Association on varieties of black walnut suitable for garden culture, and adapted to conditions in Oklahoma, Virginia, N. Carolina, Illinois and New York State.

1893. PORPÁČY, A.

Diómetzési kísérletek. (Walnut pruning.)

[German summary $\frac{1}{2}$ p.]

Bull. Fac. Hort. Budapest, 1948, **12**: 115-18, bibl. 5.

Many years of trials have shown that pruning is beneficial to walnut. As in apple, but without a central leader, a top with even distribution of fruiting wood is aimed at to ensure prolific and regular bearing. Pruning is carried out in winter, but no frost injury occurs, though the trees are in sap as early as January or even in December. After planting all shoots are cut back to 1-2 buds and in the following year the annual growth is cut back to 2-3 buds. In the third year pruning is restricted to thinning out, unless the shoots do not reach the required length of 1.5-2 m. Fruiting wood will now develop along the whole length of the branches, while the horizontally spreading crowns do not tend to form any further tiers. The trials were carried out with grafted trees of the variety Esterházi I.

Noted.

1894.

a BREGGER, J. T.

Fruit variety survey, pear, raspberry and blueberry.

Fruit Var. hort. Dig., 1948, **3**: 91-3, illus. In different States of U.S.A.

b CRANE, M. B., AND THOMAS, P. T.

Reproductive versatility in *Rubus*. III. Raspberry-blackberry hybrids. (With appendix on an integrated species difference, by C. D. Darlington.)

Heredity, 1949, **3**: 99-107, bibl. 9, illus.

c GLENN, E. M.

More about walnuts—varieties and propagation.

Fruitgrower, 1949, **107**: 387-8, illus.

d GRIGORJEV, I. N.

The history of viticulture and wine production in the Astrakan province. [Russian.] *Vinodelie i vinogradarstvo* (Wine-making and viticulture), 1949, No. 2, pp. 43-4.

e RAPHAEL, T. D.

Strawberry culture [in Tasmania].

Fruit World, Melbourne, 1949, **50**: 6: 9-10.

f REED, C. A.

Chestnut varieties [in U.S.A.].

Fruit Var. hort. Dig., 1949, **4**: 35-9. Twelve varieties are discussed.

- g RODRIGUES, A.
De l'application des procédés biométriques pour la détermination des caractères des cépages portugais de *Vitis vinifera* L. (The application of biometrical methods for the identification of Portuguese *V. vinifera* varieties.)
Bull. Off. int. Vin, 1948, 21: 203: 82-92, bibl. 13.
- h SLATE, G. L.
Breeding autumn-fruiting raspberries.
Fruit Var. hort. Dig., 1949, 4: 10-12.
At N.Y. agric. Exp. Stat., Geneva.
- i STATENS FØRSØGSVIRKSOMHED I PLANTEKULTUR.
Orienterende sortsforsøg med hassel, 1934-48. (Preliminary variety trials with hazel nuts [in Denmark], 1934-48.)
Erhvervsfrugtavl., 1949, 15: 146-9.
- j ZIELINSKI, Q. B.
Grape variety situation in Oregon and evaluation of recently introduced varieties.
Fruit Var. hort. Dig., 1949, 4: 15-22.
Both American and European varieties.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

1895. BONGINI, V.
Note fitopatologica. (Phytopathological notes.) [English summary 1 p.]
Ann. Sper. agrar., 1949, Suppl. Vol. 3, No. 1, pp. i-xxiv.
Unusual diseases of economic plants recorded in Piedmont, Italy during the years 1940-1947 include those attacking fruits, vines, vegetables and ornamentals.—Lab. sper. Fitopat. Turin.

1896. BIOLOGISCHE REICHSANSTALT FÜR LAND- u. FORSTWIRTSCHAFT, BERLIN-DAHLEM.
Reichspflanzenschutzblatt, 1943, Vol. 1, No. 1-3 (complete); 1944, Vol. 2, No. 1-5 (No. 6 missing) and 1945, Vol. 3, No. 1 [received June, 1949].

When the Nachrichtenblatt für den deutschen Pflanzenschutzdienst ceased to appear in July, 1943, publication of regulations concerning plant protection was continued in the Reichspflanzenschutzblatt.

Nutritional disturbances.

(See also 1706-1712.)

1897. JAMALAINEN, E. A.
Boorin puutteesta aiheutuvista kasvitau- deista ja boorin merkityksestä maamme kasvinviljelyssä. (Boron deficiency in Finnish crops.) [English summary 6 pp.]
Publ. agric. Exp. Act. [Finland] 130, 1949, pp. 48, bibl. 48.
Apples are included in the crops discussed. Internal cork is reported from many parts of Finland, but the severity of the trouble has been found to vary largely from year to year, 1939 and 1947 being bad years. In view of the general practice of applying liberal amounts of cow manure to the trees it is concluded that in dry summers boron is not readily available to apple roots.
1898. BEAR, F. E., AND PRINCE, A. B.
Magnesium needs of New Jersey soils.
Bull. N.J. agric. Exp. Stat. 739, 1948, pp. 19, bibl. 5.
Includes a description of magnesium deficiency symptoms observed in New Jersey fruits and vegetables.

1899. VON BRONSART, H.
Untersuchungen zur Frage der Bodenmüdigkeit insbesondere in Baumschulen. (A study of soil sickness, especially in tree nurseries.)
Reprinted from *Gartenbauforschung*, 1948(?) No. 2, pp. 16, bibl. 13.
It is known from experience and has been proved again by trials with apples recorded in this paper that soil sterilization either with carbon disulphide or other reducing agents or by dry or moist heat tends to overcome the effect of soil sickness in nurseries and vineyards. Soil analysis showed that the treatment results in increased availability of manganese, the trace element studied in this series of experiments. It is suggested that soil sterilization has the effect of mobilizing minor elements generally.—Biol. Anst. Land- u. Forstwirtschaft, Heidelberg-Wiesloch.

1900. CANDIOLI, P.
La "moria" del ciliegio. (Moria decline in cherries.)
Ital. agric., 1949, 86: 373-83, bibl. 16.
The author sums up his observations on the incidence of this, so-called, moria decline of cherries in the Verona district of northern Italy [see also *H.A.*, 18: 938, 2588]. He usefully tabulates data from 15 localities and these indicate that the phenomenon is less noticeable than a few years ago and that its chief causes are the fungus *Coryneum*, drought and unsuitable rootstocks. He suggests that the remedy for the last two can be supplied.

1901. PARMENTIER, G.
Le rougeau de la vigne. (Rougeau in vine leaves.) [English summary 8 ll.]
Bull. Inst. agron. Gembl., 1947, 16: 43-107, bibl. 89, illus.
The factors that have variously been considered responsible for the "rougeau" disorder (anthocyanin formation) in vine leaves, and the symptoms and economic importance of the disorder in vines grown under glass in Belgium are discussed. From his own investigations and from a study of the literature, the author concludes that "rougeau" is a symptom associated with several different, but possibly inter-related, pathogenic causes, among which is a disordered state of the petiole vessels resulting in tylose formation and a blockage of the vessels. The relative importance of excess soil moisture or soil dryness, accumulation of

carbohydrates, potash deficiency, excess KCl and Zn, and unbalanced nutrition in general is estimated.—Stat. Phytopath. de l'État, Gembloux.

Climatic factors.

(See also 1766, 1767, 1930, 2061 I, 2406-2408.)

1902. V. STAALDUINE, D.

De invloed van het weer bij druiven in de zomer. (The effect of weather on grapes in summer.)

Fruitteelt, 1949, 39: 476-8, illus.

An account of shanking, sun-scald and fruit cracking of grapes under glass in Holland, and the relation of these disorders to weather and glasshouse conditions during summer, particularly with regard to the temperature and relative humidity of the air.

1903. VAN HENNIK, J. J.

Droogteverschijnselen. (Drought symptoms.)

Fruitteelt, 1949, 39: 394-5, illus.

An account is given of the unfavourable effects of the dry summer of 1947 on apple, pear, and plum trees in Holland. The author suggests that more attention should be given to securing favourable soil profiles, to rational manuring, particularly with organic manures on light soils, and to choice of varieties.

1904. ROGERS, W. S.

Frost damage to fruit: The present position of research in England.

Agriculture, 1949, 56: 86-90, bibl. 6, illus.

Damage to fruit blossom by spring frosts, causing partial or complete loss of crop, is one of the most serious problems of the British fruit industry. The author reviews certain established facts, the progress already made, and describes some current lines of research. Frost research in Britain, co-ordinated by the Agricultural Research Council, takes two forms: palliative measures and the biological aspect. The first, which is the concern of the Fuel Research Station (D.S.I.R.) and the National Institute of Agricultural Engineering, includes investigations with orchard heaters and air circulators. Research on the biological aspects of spring frost damage at East Malling Research Station has been intensified in recent years. In 1948 much of the work was devoted to testing the new experimental frost chambers and to a study of experimental methods. It includes research into the nature of frost injury and the factors involved, such as age of flower, pollination, phase of bearing, rootstock, amount of foliage, moisture conditions, etc. It has been possible by the use of minute thermo-couples to follow the process of freezing and thawing of buds from minute to minute and so determine the degree of undercooling before freezing and the exact moment and temperature at which freezing of the tissue takes place. At that moment the latent heat of freezing of the water in the tissues causes an appreciable increase of temperature. An important side of the work is assessing the frost resistance of commercial varieties and new seedlings. An effort is being made to correlate frost resistance of blossoms with any character which can be found in young seedlings, so as to make possible selection at an early stage. The problem of

spring frost damage is difficult, since it involves either making substantial local changes in certain natural climatic conditions to suit existing plants, or else changing the plants to suit the climatic conditions. It would be over-optimistic to expect that any simple and complete solution will be found quickly.

1905. BEAR, E. M.

Current research on spring frosts.

Grower, 1949, 31: 597-601.

A popular report on a conference held in March, 1949, at East Malling Research Station.

1906. WHITMORE, J. S.

Frost.

Fmg S. Afr., 1949, 24: 222-6, bibl. 4, illus.

A short introduction on frost as it affects various crop plants in South Africa is followed by a simply written review of the factors which determine the severity of frost, and an explanation of the factors governing its occurrence. Charts show the average date of occurrence of the first and last killing, heavy, and light frosts of autumn and spring. These charts give some indication of the frost-intensity zones of the Union. Because frost is so localized and subject to such fluctuations from year to year, frost data cannot be readily interpreted with any great degree of refinement, and the zones at best indicate relative rather than absolute intensity.

1907. BALDINI, E.

I danni delle gelate primaverili alle piante da frutto nella primavera del 1949. (Spring frost damage on fruit trees in the plain of Florence in 1949.) [English summary 10 ll.] *Riv. Ortofrutt. ital.*, 1949, 33: 78-87, bibl. 9.

Phenomena observed on peach, plum, cherry and pear trees are recorded. Damage increased, the more advanced the stage of flowering. Damage varied according to height above ground, the higher branches being less susceptible. Local damage often occurred where cold air was held up by some natural obstacle, thus forming a frost pocket.

1908. KOEPPNER, R.

Ein weiteres Verfahren der Spät- und Frühfrostabwehr. (A further method of protection against autumn and spring frosts.)

Gärtnermeister, 1949, 52: 137-8.

A short account of developments in Germany, where the production of water mist around the fruit or vegetable crop to be protected is reported to have given very satisfactory results. In one experiment [crop not stated] damage during a 15-hour frost of -6°C . was prevented by a fine mist, the precipitation of which did not exceed 4 mm. per hour. The method is applicable also to the protection of plants in frames. On the onset of frost the lights are sealed hermetically by ice formed from the mist.

1909. BAŠIROV, F. B.

Studying the biology of the vine. [Russian.]

Vinodelie i vinogradarstvo (Winemaking and viticulture), 1949, No. 5, pp. 15-23, illus.

The author discusses methods for rejuvenating vines damaged by frost and shows how the grower can obtain a good crop of grapes on secondary shoots

in the same year that the above-ground parts are damaged.

1910. BLUMER, S.

Über die Auswirkung von Hagelschäden an Lageräpfeln. (The effect of hail injury on apple storage.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 191-6.

Trials at Wädenswil confirmed the common view that scars from hail damage do not affect the storage of apples. Photographs illustrate the sealing off of the wound by a cork layer which prevents the penetration of rotting fungi.

1911. PEYER, E.

Die aktive Hagelabwehr mit Raketen. (Combating hail with rockets.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 245-6.

In 1948, large-scale experiments were started in the Magadino plain, Switzerland, with the co-operation of the Swiss Meteorological Institute, to test the feasibility of dispersing hail storms with rockets. The article is a brief discussion of the first annual report (pp. 24). Results are not expected before an experimental period of at least 5 years, but it is noted that none of the small rockets (height ca. 700 m.) and only few of the larger type (1,200 m.) reached the altitude of the storm clouds. Tobacco, which is very liable to hail damage, is one of the chief crops grown in the plain.

1912. VAN DER KROFT, W. G.

Het probleem der stuivende gronden in Limburg. (The problem of soil erosion in Limburg.)

Abstr. from Report of National Advisory Commission of Agriculture and Forestry. *Tuinbouwgiids*, 1949, pp. 416-18.

Erosion has recently become a very serious problem on the light soils of this extensive asparagus-growing district. The ridges of loose soil, left bare until midsummer, are naturally liable to erosion by wind, but improvident husbandry has contributed to the damage. Measures to overcome the problem must include (1) planting hedges and copses as windbreaks, (2) systematic dunging and green manuring to increase the cohesion of the soil, and (3) reduction of spring cultivations. Very early crops, such as peas, asparagus and oats, or very late crops, such as potatoes and beet, should be grown where possible.

1913. HAARER, A. E.

Combating soil erosion: controls for modern orchards.

Fruitgrower, 1949, 107: 681-2.

The modern tendency to large-scale plantings and the elimination of hedges and ditches brings with it the danger of soil erosion. It is suggested that storm drains, well-spaced contour ridges and ditches, and a planting system that follows the contours of the land should be used in orchards to minimize this danger.

1914. UVAROV, F. Z.

Fruit trees and bushes for yield protection belts in the Kuibyshevsk province [of Russia]. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 3-6.

Fruit trees and bushes are recommended for inclusion

in field shelter belts, with particular mention of apples (which are useful for their fruit and as a source of seeds for raising rootstock seedlings), pears, cherries, and a hawthorn (*Eljvanger*) with large fruits which are sweet when fully ripe [*? Crataegus ellwangeriana*].

Viruses and unknown agents.

1915. KLECZKOWSKI, A.

The transformation of local lesion counts for statistical analysis.

Ann. appl. Biol., 1949, 36: 139-52, bibl. 7.

An analysis of the frequency distribution of local lesions, produced by viruses on half-leaves of a number of plants, shows that their standard error increases with increasing mean, and analysis of variance and statistical tests of significance should not be applied to lesion numbers unless they are suitably transformed. —Rothamsted Experimental Station, Harpenden, Herts.

1916. BIRAGHI, A.

Su di un'anomalia nella lignificazione di noccioli di albicocca. (Abnormal lignification of apricot stones.) [English summary 3 ll.]

Ann. Sper. agrar., 1949, 3: 143-7.

Apricots sold on the Rome markets in 1946 and 1947 showed in certain instances defects in their stones which were not fully lignified. The phenomenon resembled somewhat a virus disease noted in Bulgaria by Christoff.—Staz. Pat. veg. Rome.

1917. GRAY, E. G.

An interesting disease of gooseberries.

Gdnrs' Chron., 1949, 125: 198, illus.

A hitherto unrecorded disease of gooseberries has been observed for some years in a garden in Scotland. The new wood on affected bushes is short and spindly and arises in clusters; the leaves are small, yellowish and deeply lobed, and the flowers are numerous, but little fruit is produced. The disease proved to be very infectious, and was not controlled by spraying, liming or cutting out infected wood. It was, however, transmitted experimentally by grafting, and is therefore considered to be of virus origin. Although grafting on to blackcurrant has so far produced no result, the similarity between the gooseberry disease and black currant reversion is noted.—North of Scotland College of Agriculture.

1918. STODDARD, E. M.

The X disease of peach and its chemotherapy.

Bull. Conn. agric. Exp. Stat. 506, 1947, pp. 19, bibl. 29.

X disease, first recognized in Connecticut in 1938, is now a major peach disease in the north-eastern United States. The same, or one very similar, occurs on peaches and chokecherry throughout the northern half of the country to the Pacific coast. It is a virus disease spreading in nature from the chokecherry (*Prunus virginiana*) to peach and chokecherry but not from peach to peach in the north-eastern States. The disease can be transmitted readily by budding or grafting from peach to peach and from chokecherry to purple leaf peach. The virus can be inactivated in diseased buds by heat without injury to the plant tissue. Peach orchards can be protected from the

disease by eradicating all chokecherry growing near the orchard.

1919. ATKINSON, J. D.

Stony-pit of pears.

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 291-5, bibl. 5, illus.

Stony-pit occurs in many parts of New Zealand but seldom affects many trees in any one orchard. Fourteen out of 25 healthy trees grafted with infected wood developed stony-pit. Where healthy wood was grafted to diseased trees, scions bore a few fruits in the second season, two being pitted. Symptoms and method of transmission agree closely with those of stony-pit in the United States of America and in England [*H.A.*, 15: 92], and the disease described appears to be caused by the same virus [but see 1986].

1920. HORN, N. L., AND WOODS, M. W.

Transmission of the mild streak virus of black raspberry.

Phytopathology, 1949, 39: 377-85, bibl. 18, illus.

The mild streak disease was found to be transmitted by grafting from diseased Cumberland and Logan black raspberry plants to healthy Logan, Dundee, and hybrid plants (Cumberland \times Evans), and by "dodder grafting" with *Cuscuta subinclusa* from diseased to healthy black raspberry plants.—University of Maryland, College Park, Maryland.

1921. HARRIS, R. V., AND CADMAN, C. H.

Can the health of raspberry stocks be improved?

Scot. Agric., 1949, 28: 194-7, bibl. 3.

The main source of the spread of virus in raspberries is the infected planting material of "carrier" varieties, which carry the virus without symptom expression. To safeguard the expanding industry the adoption of a plan with the following three basic requirements is strongly recommended: For each "carrier" type variety provision must be made for "(a) establishing, under stringent conditions of isolation, a nuclear centre for propagating canes raised from graft-tested virus-free plants; (b) regular replacement of this nuclear stock by similar tested material; and (c) disposal of the cane from the nuclear centre to grower-propagators who would be responsible for the production of bulk supplies of cane." The advantages of the scheme and its operation are discussed.

1922. PRENTICE, I. W.

Resolution of strawberry virus complexes.

III. The isolation and some properties of virus 3.

Ann. appl. Biol., 1949, 36: 18-25, bibl. 11, illus.

Aphids (*Capitophorus fragariae* Theob.) allowed to feed for several days on a strawberry plant with severe crinkle transmitted two viruses. One of these (virus 1) has already been described [see *H.A.*, 16: 1890]. The other (virus 3) was transmitted by aphids which had been allowed to feed on an infected plant for 6 days or more and persisted in the vector for several days. The symptoms produced by virus 3 on *Fragaria vesca* and Royal Sovereign are described. On Royal Sovereign viruses 1 and 3 together produced symptoms

of severe crinkle and viruses 2 and 3 together produced yellow-edge.—East Malling Research Station, Kent.

1923. STELLWAAG, —, AND OTHERS.

La maladie des ramilles (Reisigkrankheit) en Allemagne. (Court-noué in Germany.) *Bull. Off. int. Vin*, 1948, 21: 213: 23-38, bibl. 24.

Three papers by German scientists and a concluding remark by a Frenchman sum up the work done in Germany on court-noué of vine. The surveys include discussions on the nature of the trouble.

1924. BOURDIOL, —, HUMBERT, —, AND EMON, J.

Reconstitution des vignes court-nouées. (The rehabilitation of vineyards affected by court-noué.)

Bull. Off. int. Vin, 1948, 21: 205: 12-15.

The hypothesis is developed that court-noué is not due to a virus but to a breakdown of cells caused by environmental conditions in susceptible vines. Remedy: replant with varieties that have shown resistance locally.

1925. BRANAS, J.

Étude et discussion sur le court-noué. (A discussion on court-noué.)

Bull. Off. int. Vin, 1948, 21: 203: 1-87.

A report of the meetings of the Commission Internationale d'Étude du "Court-noué" de la vigne of 30 June, 1947 and of the Comité de l'Office International du Vin of 1 July, 1947. Symptoms, the influence of soil cultivation and rootstock on the development of the disease, nature of the disease, phylloxera and court-noué and possible control measures are among the subjects discussed.

1926. BRANAS, J.

Recherches sur la dégénérescence infectieuse de la vigne. (A study of infectious degeneration in vine.)

Bull. Off. int. Vin, 1948, 21: 205: 7-12.

A reinvestigation of infectious degeneration in vine, carried out at Montpellier with two clones of Rupestris du Lot, confirmed the view that the leaf mosaic and the leaf deformation associated with the trouble are due to a virus complex. Pathogens and mineral deficiencies could be ruled out as possible causes of the malady, while transmission by grafting was proved. The symptoms are illustrated.

Bacteria.

1927. REID, W. D., AND BRIEN, R. M.

A further report on control of grease-spot on passion-vine.

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 306-8, bibl. 1.

A previous article [*H.A.*, 15: 1572] suggested that, for the control of grease-spot (*Phytomonas passiflorae* Reid) of passion vine, bordeaux mixture 6-8-100 should be applied from mid-March to August. The results here recorded indicate that the first application should be made at the beginning of March. Adequate spraying with bordeaux at pruning and during fruiting period controls grease-spot and prolongs productive life of passion vines. Because of damage to foliage,

Cuprox, 5 lb. to 100 gal., is not recommended as a substitute for bordeaux mixture.

Fungi.

(See also 1900.)

1928. MARSH, R. W.

Fungus diseases of fruit.

Endeavour, 1949, 8: 86-91.

Illustrated by some excellent photographs, especially of *Armillaria mellea* and apple canker.

1929. COMMONWEALTH MYCOLOGICAL INSTITUTE.*

Distribution maps of plant diseases.

24 maps a year, 6s. a year, or 3s. 9d. to subscribers to *Rev. appl. Mycol.*

Recently revised distribution maps of plant disease of horticultural interest are:

169. *Botrytis allii* Munn on *Allium* spp.

170. *Botrytis tulipae* Lind on tulip.

171. *Phytophthora richardiae* Buism. on *Zantedeschia aethiopica*.

172. *Cercospora nicotianae* Ell. & Everh. on tobacco.

174. *Phytophthora syringae* (Kleb.) Kleb. on lilac, etc.

175. *Helminthosporium torulosum* (Syd.) Ashby on banana, Manilla hemp, etc.

176. *Fomes lignosus* (Klotzsch) Bres. on *Hevea* rubber and other plants.

177. *Colletotrichum lindemuthianum* (Sacc. & Magn.) Bri. & Cav. on beans.

178. Tomato bushy-stunt virus on tomato.

1930. BÜTIKOFER, H.

Betrachtungen zur Klimaabhängigkeit von *Podospheera leucotricha*. (The effect of climate on the incidence of apple mildew.) *Schweiz. Z. Obst- u. Weinb.*, 1949, 58: 231-3.

Meteorological records from 1940 to 1947, taken at four places in Switzerland, and observations of apple mildew incidence during the same period show the relationship that exists between the climate and the development of the disease. On the whole, mild, warm (long hours of sunshine) and relatively dry conditions favour the fungus. As regards individual factors, the pathogen was found to require an average spring (April) temperature above 11° C.; a relative humidity of 60-70%, both low and high values being detrimental; and rainfall of short duration, the amount of precipitation being of less importance. Naturally, it is the combination of all these factors that determines the development of the fungus.

1931. STAEHELIN, M.

Expériences dans la lutte contre la tavelure et l'oïdium du pommier en 1948. (Trials for the control of scab and mildew of apple.) *Rev. romande Agric. Vitic.*, 1949, 5: 23-4.

In conditions unfavourable to the development of scab, wettable sulphur products proved as effective as lime-sulphur. In more critical circumstances the addition of copper compounds is recommended, especially for the pre- and post-blossom spray. In 1948 wettable

sulphur did not cause any spray damage, but precautions must not be neglected. For the control of mildew with wettable sulphur fine particle size is essential.—Lausanne research station.

1932. FEEKES, F. H.

Onderzoekingen over schimmelbestrijdingsmiddelen. I. Sporekiemingsproeven met dithiocarbamaten. (Investigations on fungicides. I. Spore germination tests with dithiocarbamates.) [English summary ½ p.] *Tijdschr. PlZiekt.*, 1949, 55: 22-30, bibl. 8.

A trial was carried out on the spores of 10 fungi, including *Sclerotinia (Monilia) fructigena* and apple and pear scabs (*Venturia inaequalis* and *V. pirina*), using a number of dithiocarbamates, with mercuric chloride and copper sulphate for comparison, all at dilutions of 0.001 and 0.0001%, by means of a spore-germination method. The direction of the degree of effectiveness is shown by $HgCl_2 > \text{dithiocarbamates} > CuSO_4$.

1933. FLIPSE, L. P.

De schurftwaarschuwingdienst. (The scab-warning service.) *Fruittteelt*, 1949, 39: 268-9, illus.

An account of the factors involved and the method adopted in Holland for warning growers when to spray for the control of apple and pear scab.

1934. SPROSTON, T.

Vermont apple scab and control 1947-1948. *Bull. Vt agric. Exp. Stat.* 550, 1949, pp. 12.

An account of observations on incidence of apple scab in relation to weather, and results obtained with various fungicides, the main features of which are given.

1935. GOHEEN, A. C.

Verticillium wilt on apricots in Washington State. *Plant Dis. Repr.*, 1949, 33: 99.

The first record of *Verticillium* wilt of apricot in Washington. *V. albo-atrum* was isolated from mummies (attached to the affected limb which bore dead twigs), dead twigs, and the wood of the main limb.

1936. BAILEY, J. S.

Further observations on the control of mummy berry on cultivated blueberries. *Proc. Amer. Soc. hort. Sci.*, 1948, 52: 299-303, bibl. 2.

Observations and trials in Massachusetts show that Fermate plus Goodrite p.e.p.s. sticker affords the most effective control of mummy berry of blueberries (*Monilinia vaccinii-corymbosi*) found so far.

1937. GAUDINEAU, M.

Le *Gnomonia* du cerisier. (Cherry leaf scorch.) *Fruit belge*, 1949, 17: 41-3, bibl. 4.

An article reviewing outbreaks of cherry leaf scorch (*Gnomonia erythrostoma*) recorded in Europe, with a short account of the disease and its control. Spraying with 2% bordeaux mixture in mid-February and again a month later is recommended.

* Ferry Lane, Kew, Surrey, England.

1938. REICH, H.
Die Blattbräune bei Kirschen. (The browning of cherry leaves.)
Mitt. ObstVersuchr. Jork, 1949, pp. 31.
The discoloration and dying off of cherry leaves described is caused by a fungus [unnamed]. The early removal of affected leaves is recommended.
1939. CATION, D., DUNEGAN, J. C., AND KEPHART, J.
The occurrence of *Monilinia laxa* in Michigan.
Plant Dis. Repr., 1949, 33: 96.
Monilinia laxa [*Sclerotinia laxa*] is recorded for Michigan. It was found on cherries, killing spurs and twigs, and it produced sporodochia on blossoms and woody tissues.
1940. LIVŠIĆ, I. Z., AND PUPYŠEVA, L. I.
Fig canker and its control.
Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 25-7.
The fig canker caused by *Phomopsis cinerescens* is described. The fig bark boring beetle [*Phrynetia spinator* Fabr.] is associated with the disease and probably assists infection by introducing the spores into the tree. Control measures recommended are (1) removal of infected branches, painting the wounds with 5% iron sulphate and then applying horticultural mastic. (2) Avoidance of wounding the trees during horticultural operations. (3) Spraying with 5% DDT against the bark beetle.
1941. WENZL, H.
Die Grenzen der therapeutischen Sommerbekämpfung des amerikanischen Stachelbeermehltaus. (Limitations in the usefulness of summer spraying against American mildew of gooseberries.) [English summary $\frac{1}{2}$ p.]
PflSch. Ber. Wien, 1949, 3: 10-16, bibl. 6.
The data show that thorough spraying with 0.5% calcined soda or with 1% formalin plus spreader will control *Sphaerotheca mors-uvae*, even when carried out so late that the berries are completely covered with mildew. For practical purposes, however, the control of the fungus at this stage is of limited value, since the cork layer formed on the berries as a result of the infection inhibits further growth. Bordeaux mixture proved unsatisfactory, and in any case copper sprays cannot be applied once the berries have reached pea size.—Bundesanst. f. Pflanzenschutz, Vienna.
1942. MILLER, P. W.
Nut diseases in the Pacific Northwest in 1948.
Plant Dis. Repr., 1949, 33: 20-1.
Brief notes are given on the following diseases:—Walnut: blight (*Xanthomonas juglandis*), mushroom root rot (*Armillaria mellea*), downy root (*Microstoma juglandis*) and three non-parasitic disorders. Filbert: blight (*Xanthomonas corylina*), mildew (*Phyllactinia corylea*) and three non-parasitic disorders.
1943. MILLER, H. N.
Development of the leaf spot fungus in the olive leaf.
Phytopathology, 1949, 39: 403-10.
An account of the development of *Cycloconium oleaginum* Cast., in the olive leaf. The fungus remains alive and continues to grow as a saprophyte on olive leaves after they have fallen to the ground.
1944. GOULD, E., AND TAYLOR, C. F.
Effect of insecticidal sprays on incidence of peach scab in West Virginia.
Plant Dis. Repr., 1949, 33: 16-17.
The data recorded for trials against peach scab (*Cladosporium carpophilum*) show that lead arsenate/zinc sulphate mixture gave considerable protection, but that organic insecticides gave little, if any, control. Where such materials are used, sulphur applications for control of scab should be correctly timed.
1945. CATION, D., AND DUNEGAN, J. C.
The overwintering of *Monilinia fructicola* in twig cankers under Michigan conditions.
Plant Dis. Repr., 1949, 33: 97-8.
Observations showed that *Monilinia* [*Sclerotinia*] *fructicola* overwinters in peach twig cankers in Michigan, but spore production is so low that such cankers are unlikely to threaten the safety of succeeding crops.
1946. WEAVER, L. O.
Observations on the use of lime-sulfur sprays on peach in Maryland, 1948.
Plant Dis. Repr., 1948, 32: 515-17.
In the experiments recorded for the control of scab (*Cladosporium carpophilum*) and brown rot (*Monilinia fructicola*), lime-sulphur (2 or 3 qts. per 100 gal.) was less effective than wettable sulphur or sulphur dusts for protecting peaches prior to harvest.
1947. MULDER, D., AND VLASVELD, W. P. N.
De invloed van de bespuitingen voor de bloei op de aantasting van peren door schurft in 1947. (The effect of pre-blossom spraying on the incidence of pear scab in 1947.) [English summary $\frac{1}{2}$ p.]
Meded. Dir. Tuinb., 1949, 12: 192-6.
The epidemic outbreak of pear scab in Holland in 1947 is attributed to (1) the application of fungicides with DNC long before the warning was given, and at concentrations too low, (2) the omission by many growers of the second pre-blossom spray owing to the bad weather, and (3) delay in the spore ejection so that the main ascospore discharge occurred about the time of blossoming and the period between spraying and expulsion of spores was too long. It is concluded that spraying should be carried out as closely before and after blossoming as possible.
1948. PALMITER, D. H.
Sooty blotch disease of pears and its control.
Bull. N.Y. St. agric. Exp. Stat. 734, 1948, pp. 15.
Previous work on sooty blotch disease (*Gloeodes pomigena*) of apples and pears is reviewed, and data are presented of control trials carried out by the author. Dinitro materials applied at the green tip stage gave the same degree of control as three applications of a good summer fungicide. Fermate at 1 lb. to 100 gal. applied three times during June and July afforded better control of sooty blotch than wettable sulphur.

1949. VANDERWALLE, R.

Une affection des marcottes de prunier causée par *Cylindrocladium scoparium*. (A disease of plum layers caused by *Cylindrocladium scoparium*.) *Parasitica*, 1949, 5: 5-8.

A disease in nursery rows of plum layers in Belgium is attributed to *Cylindrocladium scoparium*. No fungal fructifications have been found on the affected plants or in culture, but the symptoms are similar to those of a *Cylindrocladium* shoot wilt of plum layers in England (*H.A.*, 15: 100; 13: 1279; 18: 2451). The disease was most serious on the variety St. Julien, while Black Damas and Brompton were only slightly affected.

1950. GHILLINI, C. A.

Sul "marciume acquoso" delle susine provocato da "*Taphrina pruni*" Tul. (Watery rot of plums due to *T. pruni*.) [English and French summaries.] *Riv. Fruttic.*, 1949, 11: 75-81, bibl. 7.

The author describes the appearance of what Wormald in his *Diseases of Fruits* terms "pocket" or "bladder plums". The fungus appears to do its damage in the period following the fertilization of the ovary. Further studies on the biology of the disease are in progress.—*Ist. Pat. veg. Bologna*.

1951. PITCHER, R. S., AND WEBB, P. C. R.

A fungus disease of raspberries induced by insect attack. *Nature*, 1949, 163: 574-5, bibl. 4.

A note on recent observations which indicate that the activities of the raspberry-cane midge (*Thomasiniana theobaldi*) produce a substrate favourable for the establishment of fungal wound parasites such as *Leptosphaeria coniothyrium*, *Fusarium culmorum*, and *Didymella applanata*. Tests so far carried out suggest that the midge does not introduce fungal spores into the cracks, but rather that they are air- or water-borne. [See also 2000.]

1952. ZÉLLER, S. M., AND CAMPBELL, L.

Synchytrium found on the roots of strawberry, *Phytopathology*, 1949, 39: 149-51, illus.

A new species of *Synchytrium*, described as *S. fragariae*, was found causing small, nodule-like galls on roots of the cultivated strawberry in Washington State.—*Western Washington Experiment Station*.

1953. COUTINHO, M. C. P.

Obtenção de videiras resistentes ao mildio. (The production of mildew-resistant vines.) *An. Inst. sup. Agron. Lisboa*, 1943, 14: 175-83, bibl. 6 [received 1949].

An account of preliminary attempts by crossing and open pollination to obtain varieties of vine immune to mildew (*Plasmopara viticola*). Among the plants selected were some which showed a necrotic type of reaction, i.e. the presence of the fungus was indicated by small necroses on the leaves without the development of fructifications.

1954. DALMASSO, G.

Le viti americane e la loro resistenza alla peronospora. (The resistance of American vines to mildew [*Plasmopara viticola*].) *Ital. agric.*, 1949, 86: 220-4, bibl. 2.

The author gives an account of the views of Merjanian and especially of Nysterakis as expounded in his *Recherches sur les causes de la résistance des vignes américaines et de leurs hybrides au "Plasmopara viticola"*, Imprimerie Toulousaine, Toulouse, 1943. While much still remains to be worked out, Nysterakis' most important theory is that the resistance is really due to hypersensitivity of cells in resistant vines to the toxins of the parasite and, to demonstrate the accuracy of this thesis, he describes the progress of the disease in resistant and non-resistant vines.

1955. STAEHELIN, M., AND WURGLER, W.

Recherches récentes sur le rougeot parasitaire en Suisse romande. (Recent investigations on rougeot of vine in French-speaking Switzerland.) [German summary ½ p.] *Landw. Jb. Schweiz*, 1949, 63: 69-120, bibl. 55.

An epidemic of rougeot (*Pseudopeziza tracheiphila*), which spread through the vineyards of French-speaking Switzerland in the years 1943-47, made a reinvestigation of the disease desirable. The following points emerge: (1) Outbreaks of rougeot are liable to occur in dry years. (2) A single year with plenty of rain is not sufficient to restore the health of an infected vineyard. (3) All vine varieties, including direct-producers, are equally susceptible. (4) In French-speaking Switzerland ascospores are formed from the end of April onwards. Precipitations above 15 mm. are necessary to cause a mass infection of young leaves in May. In a dry season outbreaks do not occur until later in summer. (5) On the leaves of the Chasselas variety the first yellow spots appear 2-3 weeks after infection, but the plants do not develop fully characteristic symptoms until 5-6 weeks later. (6) Late infections, which are occasionally observed, may be caused by ascospores formed on dropped leaves that are sheltered from the rain by stones. (7) In general, the fungus attacks leaves only. The desiccation of grapes on heavily attacked vines is a secondary phenomenon resulting from the reduction in leaf area. (8) Rougeot can be effectively controlled, as the data show, by early and repeated applications of a 2% bordeaux mixture. It is essential for a copper deposit to be on the leaves at the time when the rain disperses the ascospores. An addition of wettable sulphur increases the effectiveness of the spray but diminishes its value against downy mildew.—*Horticultural Research Station, Lausanne*.

1956. BERNON, G.

Altérations de sarments dans les Pyr.-Or. (A disease of vine shoots in the eastern Pyrenees.) *Prog. agric. vitic.*, 1949, 66: 81-3, illus.

A disease of vine shoots causing the bunches of grapes to wither, is attributed to *Coniothyrium diplodiella* which produces lesions encircling the shoots. Control measures recommended are (1) cutting off and burning all affected shoots and grape bunches and (2) destroying any fungal fructifications remaining on the shoots by applying a corrosive liquid containing sulphuric acid (8:100) or iron sulphate 30% in 1% sulphuric acid, a fortnight after pruning or at least three weeks before the buds burst.

Mites and insects.

(See also 2589.)

1957. WEBSTER, R. L.

*Mites of economic importance in the Pacific north-west.**J. econ. Ent.*, 1948, 41: 677-83.

Notes on the occurrence and control of the following: clover mite, Pacific mite, two-spotted mite, Willamette mite, European red mite, pear leaf blister mite, blackberry mite, loganberry mite and rust mite. The effect of DDT sprays on the population of some of these species is recorded.

1958. ANDERSEN, V. S.

*Untersuchungen über die Biologie und Bekämpfung der Obstbaumspeinnmilbe Paratetranychus pilosus Can. et Fanz. (Biology and control of the European red mite.)**Thesis. Bonn Univ.*, 1948, pp. 118, bibl. 54, illus.

An account of work carried out in 1943 to 1946 at Leverkusen. In the earlier chapters the systematics, nomenclature, and morphology of the European red mite (fruit tree red spider) are considered. Other chapters give an account of its geographical distribution, host plants, the damage caused, and its control. Against the winter eggs in the field the best results were obtained by a late spraying (11 April) with 5% and 6% mineral oil. Of the tar oil products heavy oil was the most ovicidal, but it was less effective than mineral oil. During the growing period the polysulphide preparations lime-sulphur (2%) and Solbar (1%), and mineral oil (0.5%) were equally effective at those concentrations. For the control of the mite on peaches the organic insecticide E605 has given promising results, for it is effective at lower concentrations.

1959. WYBOU, A.

*Notice sur "l'araignée rouge des arbres fruitiers". (Note on the fruit tree red spider.)**Fruit belge*, 1949, 17: 110.

It is pointed out that "the fruit tree red spider" is two species, *Metatetranychus ulmi* K. and *Bryobia praetiosa* K. and this must be taken into account when control measures are considered.

1960. GROB, H.

*Die Möglichkeiten der Bekämpfung der Obstbaumspeinnmilben. (The control of fruit tree red spider mites.)**Schweiz. Z. Obst- u. Weinb.*, 1949, 58: 165-9.

Trials with Etilon, a parathion preparation, carried out by Geigy in the Valais in comparison with sulphur and dinitro compounds, led to the recommendation of a pre- and post-blossom application of Etilon at a concentration of 0.1%. Later infestations may be dealt with by incorporating this insecticide in the anti-codling moth sprays. Data of the red spider control achieved are tabulated.

1961. KUENEN, D. J.

*Parathion tegen spint op vruchtbomen. (The control of fruit tree red spider by parathion.)**Meded. Dir. Tuinb.*, 1949, 12: 188-9.

In experiments carried out in Holland it was found that parathion destroyed the mite in all stages of development except the egg. It is suggested, therefore, that it be applied in the spring when all the winter eggs are hatched and the summer eggs not yet laid; generally this would be immediately after flowering, when the spray would also control sawfly. It cannot be used if the orchard has an undercrop of bush fruit, because of its very poisonous nature.

1962. MITCHELL, A. E., AND OTHERS.

*The relation between different methods of applying parathion and the amounts deposited on apple leaves for the control of European red mite.**Quart. Bull. Mich. agric. Exp. Stat.*, 1949, 31: 309-12.

The quantities of residual parathion deposited on the leaves 14 days after an application of 1.2-1.5 oz. of the chemical per tree were 15.2, 31.2, 7.1 and 0.4 p.p.m. in the case of a conventional spray, a concentrate spray, a wet dust and a dry dust respectively. The results show that a considerable economy of chemicals may be effected, if concentrate instead of conventional types of spray are used.

1963. WINGO, C. W., AND THOMAS, G. W.

*Development of the two-spotted spider mite in the presence of DDT and other insecticides.**J. econ. Ent.*, 1948, 41: 688-91, bibl. 4.

Greenhouse experiments are reported in which the effect of DDT on the development of the two-spotted spider mite in the absence of predators is investigated. Orchard strength DDT spray (0.125%) was found to inhibit mite development on soyabean test plants to an extent of about 50%. At the higher concentrations of 0.75% and 1% DDT, less than 1% of the normal number of live stages developed. The influence of other insecticides and acaricides upon the two-spotted mite development is also reported.—University of Missouri, Columbia.

1964. SHERMAN, F., III., AND KING, H. L.

*Tests in 1947 against the two-spotted mite.**J. econ. Ent.*, 1948, 41: 807-8.

In six series of single-spray tests conducted by the Michigan State College, East Lansing, parathion gave outstanding control of the two-spotted mite in apple orchards, and left a residue which killed the mites hatching after treatment. The dicyclohexylamine salt of dinitro-*o*-cyclohexyl phenol, TEPP and HETP were somewhat less effective than parathion and showed no residual effect. Bis(*p*-chlorophenoxy)methane was found ineffective.

1965. NEWCOMER, E. J., AND DEAN, F. P.

*Studies of orchard acaricides.**J. econ. Ent.*, 1949, 41: 691-4, bibl. 1.

Several acaricides were tried out in apple orchards in the Pacific Northwest of the United States in an attempt to find a preparation that could be used in conjunction with the DDT codling moth sprays to prevent a build-up of the European red mite and the Pacific mite populations. Only 1,1-bis(*p*-chlorophenyl) ethanol and parathion showed promise of being effective when used in a reasonable number of sprays.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

1966. MORGAN, C. V. G., AND MARSHALL, J.
Dinitrophenol derivatives as summer acaricides in British Columbia.

Sci. Agric., 1949, 29: 191-9, bibl. 12.

A report of experiments made over the last 10 years by the Dominion Entomological Laboratory, Summerland, B.C., on the use of dinitrophenol derivatives for control of orchard mites in the Okanagan Valley. The monoethanolamine salt of dinitro-cyclohexylphenol proved the most effective of the substances tested, both in its initial kill and its residual action. Commercially it has given reasonably satisfactory control of European red mite when used in combination with DDT.

1967. CARLSON, F. W.

Tests of toxicants for the peach silver mite.

J. econ. Ent., 1948, 41: 836.

Among other insecticides, tetraethyl phosphate, nicotine sulphate and parathion gave good control of peach silver mite (*Vasates cornutus*) in orchards in the Yakima valley of Washington.

1968. FRANKLIN, H. J.

Cranberry insects in Massachusetts.

Bull. Mass. agric. Exp. Stat. 445, 1948, pp. 64, illus.

Twenty-one insects are described under (1) fireworms, (2) cutworms, (3) spanworms, (4) hairy worms, (5) miscellaneous, and are illustrated by many photographs and 4 coloured plates. "A plentiful water supply for flooding whenever necessary is a good and cheap insurance against insect injury on cranberry bogs, and should be provided if the cost is not prohibitive. Where a water supply is lacking or its use for any reason impracticable, dusting, spraying, sanding, or other measures must be adopted."

1969. BARON, C.

Pucerons et acariens. (Aphids and mites.)

Fruit belge, 1949, 17: 33-40.

An account of the aphids and mites which infest fruit trees, including the life history of aphids, the distinguishing characters of the aphids of both stone and pome fruits, the biology of mites, general control measures in winter, and in spring and summer, preparations to use and times of application.

1970. HEINZE, K.

Die Überwinterung der grünen Pfirsichblattlaus *Myzodes persicae* (Sulz.) und die Auswirkung der Überwinterungsquellen auf den Massenwechsel im Sommer. (The hibernation of the green peach aphid and its effect on mass migration in summer.)
NachrBl. dtsh. PflSchDienst, 1948, 2: 105-12, 145-8, bibl. 25.

As a result of his biological study of the green peach aphid the author demands that in seed potato growing areas, where the summer form cannot normally hibernate in the open, peach and apricot culture should be prohibited. Where this is not possible, spraying of the trees in winter and spring should be made compulsory.

1971. BROADBENT, L.

Factors affecting the activity of alatae of the aphids *Myzus persicae* (Sulzer) and *Brevicoryne brassicae* (L.).

Ann. appl. Biol., 1949, 36: 40-62, bibl. 16.

Apparatus for testing the frequency of flights of aphids under different conditions of temperature, relative humidity, light and pressure, is described, and results obtained are recorded in tables and graphs. It is concluded that changes in microclimate in crops are adequate to influence frequency of flight of aphids and consequently the spread of virus diseases.—Rothamsted Experimental Station, Harpenden, Herts.

1972. CANDURA, G. S.

Anticoccidici invernali. (Winter spraying against scale insects.)

Ital. agric., 1949, 86: 43-57, illus.

Descriptions of *Aspidiotus ostraeformis*, *Diaspis leperi*, and of *Aspidiotus perniciosus* are followed by an account of spraying operations and the improvement in the substances used in recent years in Italian orchards. The most important of these are listed.

1973. THORNE, F. T.

Additional host records for the scale *Parlatoria theae* in California.

J. econ. Ent., 1948, 41: 649, bibl. 3.

During a heavy infestation of the scale insect, *Parlatoria theae*, in California many plants were attacked that had not previously been recorded as hosts. These included avocado, *Bauhinia*, apricot, loquat and *Pyracantha*. Recorded hosts that were not attacked, although exposed to infestation, included lemon, sweet orange, *Hibiscus* and *Poinsettia*.

1974. BELLIO, G.

Prove di fumigazione invernale di alberi da frutto a foglie decidue contro la *Parlatoria oleae*, altre cocciniglie ed altri insetti. (Winter fumigation of deciduous fruit trees against scales and other insects.) [English summary 8 ll.]

Ann. Sper. agrar., 1949, 3: 415-31, bibl. 2.

Trials in Southern Italy using tents and HCN lead the author to state that the control of *Parlatoria oleae*, *Aspidiotus perniciosus*, *Ceroplastes rusci* and *Eriosoma lanigerum* can be successfully achieved in winter by these means. Directions for fumigation and proper dosage are given.—Oss. reg. Fitopat. Acireale.

1975. JANCKE, O.

Erfolgreiche San José-Bekämpfung in der Pfalz. (Successful San José scale control in the Palatinate, Germany.)

Ceres, Hamburg, 1949, 2: 4/5: 23-5, bibl. 3.

Two years of consistent spraying justify the hope that this pest will soon be under control in the Palatinate, where infestation has been severe.

1976. MARR, G.

Versuche über Sommerbekämpfung der San José-Schildlaus. (Summer spraying against San José scale.)

Höfchen Briefe, 1949, 2: 1: 18-25.

Complete control was achieved with 2-3 applications of E605 f at 0.03%, while a single application in July reduced the population on 1 December by almost 80%.

1977. BÖHM, H.

Sommerbekämpfung der San José-Schildlaus. (Summer spraying against San José scale.) [English summary ½ p.]

PflSch. Ber. Wien, 1949, 3: 1-9, bibl. 7.

While nicotine, lime-sulphur, DDT and benzene hexachloride failed to control the pest, an almost 100% kill was obtained with diethyl p-nitrophenyl thiophosphate (0.05 vol. % of a product containing 70% of the active agent). The success depends on thoroughly wetting the bark, which is difficult with trees in leaf. In the case of severe infestation and after rain the treatment should be repeated. The second application is useful also for the control of codling moth.—Bundesanst. f. Pflanzenschutz, Vienna.

1978. GEIER, P., AND JENNY, J.
Quelques aperçus techniques de la mise au point des fumigations insecticides dans la lutte contre le pou de San-José. (The technique of fumigation against San-José scale.)

Rev. romande Agric. Vitic., 1949, 5: 43-5.

The article contains an illustrated description of the latest HCN fumigation equipment used in Switzerland: (1) the chambers installed at frontier railway stations for the fumigation of imported nursery material; and (2) the mobile chambers capable of treating 300 3-year-old standard trees at a time. It has been found possible to lower the effective concentration of the gas to 7.5 g./m.³.

1979. SPAGNOLI, A.
La viticoltura italiana e i danni della fillossera. (Italian viticulture and the losses caused by phylloxera.)
Ital. agric., 1949, 86: 233-5.

Figures are given for the different vinegrowing districts of Italy of the vine areas attacked and those actually destroyed by phylloxera. The islands, Sicily and Sardinia, come off best with only 0.8% destroyed. The larger areas vary considerably, from 16.3% (25,726 ha.) in Emilia-Romagna to 30.1% (6,411 ha.) in Liguria. Planting afresh on approved phylloxera-resistant stocks should restore the situation.

1980. SCHELLENBERG, A.
Die Reblausbekämpfung im Kanton Zürich von 1886 bis 1948. (Phylloxera control in the Canton of Zürich from 1886 to 1948.)
Schweiz. Z. Obst- u. Weinb., 1949, 58: 145-8, 180-4, bibl. 15.

The history of public phylloxera control in the Canton of Zürich is reviewed from its introduction in 1886 to its discontinuation in August, 1948. The widespread use of resistant rootstocks has helped to overcome the danger.

1981. SCHILDER, F. A.
Die Blattreblaus auf der Edelrebe. (Phylloxera incidence on the leaves of *Vitis vinifera* vines.)
Züchter, 1949, 19: 184-7.

The paper is the statistical evaluation of extensive counts (120,000 leaf galls on 16,000 leaves) made in 1933 at the Naumburg branch of the Biologische Zentralanstalt. The data refute the frequently held belief that density of hairiness is related to the phylloxera (*Daktulosphaira vitifoliae* [sic]) resistance of *vinifera* vine leaves. The leaves of certain varieties, however, were found to delay the development of the pest.

1982. FLUKE, C. L.
Buffalo treehopper adults controlled with DDT.
J. econ. Ent., 1948, 41: 664-5, bibl. 2.

DDT at the rate of 3 lb. wettable powder per 100 gallons gave excellent control of treehopper (*Ceresa bubalus*) on apples when applied to the trees and ground cover in late August during the egg-laying stage.—University of Wisconsin.

1983. GAMBRELL, F. L.
Experiments with DDT for control of the potato leaf-hopper on apple nursery stock.
J. econ. Ent., 1948, 41: 651-2, bibl. 2, illus.

"Preliminary experiments indicate that a 3% DDT-talc dust, when applied by airplane at the rate of 45 lb. or more per acre, is effective against nymphs and adults of the potato leafhopper [*Empoasca fabae*] on apple nursery stock."—New York State agric. Exp. Stat., Geneva.

1984. SNAPP, O. I.
Control of sucking bugs that cause deformed peaches.
J. econ. Ent., 1948, 41: 555-7, bibl. 2, illus.

In field trials in S. Carolina DDT continued to give good control of sucking bugs which cause deformed peaches. [For earlier experiments, see *H.A.*, 16: 1914 and 17: 1336.] It was most effective when applied at petal fall; little control resulted from the shuck-off application. Except when applications were made at the shuck-off stage only, DDT proved somewhat more effective than benzene hexachloride. Application of DDT by fog machine was as efficient as by conventional power sprayer.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

1985. PEDERSON, C. E., AND SHERMAN, F.
Field applications to control spittle bugs in Michigan.
J. econ. Ent., 1948, 41: 659-61, bibl. 3.

On strawberries, 6% gamma benzene hexachloride, at 1.5 lb. per 100 gal. and 450 gal. per acre, gave nearly perfect control of spittle bugs, *Philaenus leucophthalmus*, which have caused considerable injury to crops in Michigan. Rotenone, DDT, nicotine sulphate and HETP were less satisfactory.—Michigan State College, East Lansing.

1986. GOIDANICH, G.
Una esperienza sulle "pere pietrose". (Stony pit in pears.) [English summary 4 ll.]
Ann. Sper. agrar., 1949, 3: 171-8.

The author isolated by cage branches of pear which had previously borne stony fruits for several years. No stoniness appeared in the fruit of the caged branches which were kept completely isolated, but it developed in fruits on branches the caging round which was less rigorously sealed, and in them hemipterous insects of the genus *Calocoris* were discovered. It is supposed that the punctures made by this insect were responsible for the stoniness [but see 1919].—Staz. Pat. veg. Rome.

1987. SMEDING, P.
De perebladvlo. (The pear psyllid.)
Meded. Dir. Tuinb., 1949, 12: 138-9, bibl. 3.
The life history of the pear psyllid (*Psylla pyricola*) is

outlined, and the damage it causes described. Good control has been obtained with a spray of 3% derris, and this should be applied whenever the first larvae are seen.

1988. PUTNAM, L. G.

Sprays and dusts for grasshopper control.

Processed Publ. Canada Dep. Agric. Ser.

Ent. 73, 1948, pp. 6.

Some of the new insecticides may now be used in place of or as a supplement to poisoned baits. Chlordane and chlorinated camphene act more as stomach than as contact poisons and they should be sprayed or dusted on plants upon which the grasshoppers are feeding. They are usually supplied as emulsion concentrates and only the addition of water is necessary. Sprays may also be prepared using wettable powders or spray powders and water. Chlordane has given good results at $\frac{3}{4}$ lb. per acre in emulsion or wettable powder sprays, and chlorinated camphene has been satisfactory at $1\frac{1}{2}$ lb. per acre. Contact poisons of promise are DNOC and gamma-BHC.

1989. HANDFORD, R. H.

Grasshoppers.

Processed Publ. Canada Dep. Agric. Ser.

Ent. 86, 1948, pp. 4.

The life history and habits of grasshoppers are outlined, and control measures, particularly the use of poisoned bait, are described [see also 2427].

1990. SHOTWELL, R. L.

The comparative effectiveness of poisoned bait and sprays for grasshopper control in Lyman County, S. Dak., 1947.

[*Publ.*] *U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar.* E-771, 1949, pp. 22.

Preliminary field tests in S. Dakota indicate the efficacy of chlordane and toxaphene sprays against *Melanopus differentialis*.

1991. PARKER, J. R.

Tests of insecticides for grasshopper control, 1947.

[*Publ.*] *U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar.* E-774, 1949, pp. 18, bibl. 1.

Chlordane and toxaphene (chlorinated camphene) applied as sprays or dusts gave the most promising results against grasshoppers in California, Montana and Arizona in 1947. Benzene hexachloride was erratic, hexaethyl tetraphosphate was very successful the first day. Parathion showed much promise.

1992. KOTTE, W.

Heuschreckenschaden in Deutschland.

(Locust damage in Germany.)

Höfchen Briefe, 1949, 2: 1: 13-18.

In the summer of 1948, the wingless locust *Orphanidia denticauda* appeared in large swarms in certain parts of southern Germany, causing damage to potatoes and other crops. E605 proved effective in laboratory tests and in a preliminary field trial.

1993. ČUGUNIN, JA. V.

The application of DDT preparations for the control of weevils. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 4, pp. 11-14.

From observations on the results of applying DDT with a horse-machine for the control of apple rhynchites it was found that effectiveness depended on temperature. Thus the death rate was 68.6% when applications were made in October, but 100% when made in June, and it is advised that the applications should be made when temperatures are not lower than 12° C. The author concludes that dusting with DDT does not adversely affect bees in hives situated in treated orchards.

1994. KUENEN, D. J.

De peregloesemkever (*Anthonomus pyri* Koll.) in Nederland. (The pear blossom weevil in Holland.) [English summary $\frac{1}{2}$ p.] *Tijdschr. PLZiekt.*, 1949, 55: 2-22, bibl. 4, illus.

An account is given of the life history of the pear blossom weevil, which causes damage both by feeding and oviposition, nearly all punctured buds failing to develop. Control can be obtained with one application of a spray containing DDT at the beginning of the period of activity in September. As soon as the first feeding punctures are found, fruitgrowers are notified. If the percentage of damaged buds in spring is less than 2% spraying in September is not advised.

1995. SNAPP, O. I.

New insecticides for control of plum curculio on peach.

J. econ. Ent., 1948, 41: 569-74, bibl. 1.

In cage tests carried out by the Bureau of Entomology and Plant Quarantine, parathion (at the rate of 0.5-2.0 lb. 15% wettable powder per 100 gal. water) killed 100% plum curculio (*Conotrachelus nenuphar*) adults within 2-5 days. Moreover, spray deposits retained their effectiveness longer than those of any of the other insecticides tested. Chlorinated camphene and chlordane also gave promising results and caused no damage to fruit or foliage. Hexaethyl tetraphosphate controlled curculio but was damaging to foliage. Tetraethyl pyrophosphate, benzene hexachloride and "Ryania" were relatively ineffective.

1996. TAYLOR, J. S.

Notes on the olive beetle (*Argopistes sexvittatus* Bryant).

J. ent. Soc. sthn Afr., 1945, 8: 49-52, bibl. 5, from abstr. in *Rev. appl. Ent.*, 1949, 37: 53.

Cultivated olive (*Olea europaea*) is grown in a few gardens in Graaf-Reinet, Cape Province, where its chief pest is the olive beetle, the life history of which is described. The control measures recommended in the Western Province, where both *A. sexvittatus* and *A. oleae* attack cultivated olives, are 3 or 4 applications at intervals of 4-6 weeks between harvest and blossoming (about May and September, respectively) of a spray containing 4 lb. lead arsenate and $\frac{1}{2}$ lb. spreader in 100 gal. water. This proved effective in Graaf-Reinet.

1997. DIVISION OF FRUIT INSECT INVESTIGATIONS, U.S. DEPARTMENT OF AGRICULTURE.

Controlling the Japanese beetle.

Fmrs' Bull. U.S. Dep. Agric. 2004, 1949, pp. 14, illus.

The Japanese beetle has been a plague in recent years in many eastern states of U.S.A. It feeds on nearly

275 kinds of trees, shrubs, and other plants (including roses and other flowers), severely injuring many of them. Tree and bush fruits are subject to attack. Lists are given showing plants subject to feeding by beetles, and plants rarely fed upon by beetles. The grubs feed in the ground on plant roots. Control measures include the application of DDT sprays or dusts, hand collection, and trapping. The grubs may be controlled by soil treatment with DDT or chlordane. A number of the more important insect parasites of the beetle have been introduced from Asia and two of them have become established in one area.

1998. VAYSSIERE, P.
Hannetons et vers blancs. (Cockchafer and white grubs.)
Jardins Fr., 1948, 2: 264-7, and 1949, 3: 4-8, bibl. 6.

Some figures illustrating the serious damage caused by cockchafer beetles and larvae in France and her colonies, and notes on the biology and habits of the main species, are followed by a survey of modern methods of control. Results obtained by workers in France, England, and Switzerland are supplemented by the author's own findings. The new synthetic insecticides seem to provide an answer to the problem, as the application of foliage dusts of DDT and 666 when the chafers are swarming will kill the adults, and soil treatment with 666, combined with mechanical cultivation, will control the larvae. A control programme is outlined.

1999. CLAUSEN, R.-L.
La lutte contre le hanneton *Melolontha melolontha* L. (Cockchafer control.)
Verh. schweiz. naturf. Ges., 1947, 127: 93-4, bibl. 9 from abstr. in *Rev. appl. Ent.*, 1949, 37: 116.

Two applications, at weekly intervals, of suspensions of BHC (benzene hexachloride) at 1.95 lb. per 100 gal. and DDT at 2 lb. were applied to plum trees in Switzerland to protect them from attacks by adult cockchafer. The materials were about equally effective and, a fortnight after the second application, the amount of damage on the upper parts of the trees was less than half that on controls. When trees were sprayed with a suspension of BHC at 2.6-3.9 lb. per 100 gal., the beetles were killed in 48 hours even 11-13 days after application, and a suspension of DDT at 2-3 lb. per 100 gal. was similarly toxic in 72-96 hours after 10-16 days.

2000. BACHMANN, F., AND FISCHER, H.
Gallmückenlarven an Himbeerruten. (The raspberry cane midge.)
Schweiz. Z. Obst- u. Weinb., 1949, 58: 248-50.

In Switzerland spots on raspberry canes were found to be due to larvae of the raspberry cane midge, *Thomasiana theobaldi*. It was further observed that varieties susceptible to spur blight (*Didymella applanata*) were most affected. With reference to Massee's work on the relation between cane blight (*Leptosphaeria coniothyrium*) and midge infestation the question is raised, whether in the past losses attributed to spur blight were not really due to raspberry cane midge

attack as the primary cause. The problem is being investigated. [See also 1951.]

2001. SWAN, D. C.
Fruit flies.
Reprint Waite agric. Res. Inst. 527, 1949 [?], pp. 12.

Two species of fruit fly occurring near Adelaide, South Australia, are the Queensland fruit fly, *Strumeta tryoni* Froggatt and the Mediterranean fruit fly *Ceratitis capitata* Wied. Their life histories and habits are described and a programme for their eradication is set out. "The campaign must continue to depend on stripping off fruit along the lines prescribed, on spraying with DDT and foliage baits, on the prohibition of movement of fruit in, or out of, the affected areas, and on the removal from such localities of fruits ripening early in the subsequent summer."

2002. BESSON, J., AND GAIRAUD, R.
Observations biologiques sur la tordeuse orientale du pêcher (*Laspeyresia molesta* Busk.) dans le sud-ouest, au cours des années 1946-1947-1948. (Observations on the biology of the oriental peach moth in the south-west of France during 1946, 1947, and 1948.)
C.R. Acad. Agric. Fr., 1949, 35: 187-92.

Further notes on the life history and habits of the oriental peach moth in south-west France [*H.A.*, 16: 1407 and 1940]. The difficulties attending control measures are pointed out.

2003. RINGS, R. W., AND WEAVER, C. R.
Effects of benzene hexachloride and DDT upon parasitization of the oriental fruit moth.
J. econ. Ent., 1948, 41: 566-9, bibl. 4.

Macrocentrus ancylovorus, a parasite of the twig-infesting larva of the oriental fruit moth, has been artificially distributed and established at great expense in Ohio. This paper reports on the studies conducted at Ohio agricultural Experiment Station to determine the effects of DDT and benzene hexachloride sprays on this important parasite. Benzene hexachloride did not appear to reduce parasite activity at all, but DDT had serious effects. Rates of parasitization normally increase 100% during the season; in DDT-treated orchards only a 10% increase occurred. A dangerous selective action was observed with some DDT residues (e.g. 5% dusts), for these were found to be more toxic to the parasite than to the fruit moth.

2004. BINFIELD, R. E.
Tree banding for codling moth control.
N.Z. J. Agric., 1949, 78: 157.

Advice is given on the preparation of, and fixing, the bands, and on the precautions to be taken in their use so that they can be most effective.

2005. LOEWEL, E. L., AND REICH, H.
Versuche zur Bekämpfung der Obstmaden mit E 605. (The control of codling moth with E 605.)
Mitt. ObstbVersuchsr. Jork, 1949, pp. 46-7.

In comparative trials, carried out for one year in an orchard of heavily infested Cox's Orange trees, 0.01% E605f proved as effective as lead arsenate for the control of codling moth.

2006. CAMERON, A. E.

Insect pests of 1947.

Misc. Publ. Edin. E. Scot. Coll. Agric. 26, 1948, pp. 22, reprinted from Trans. Highland agric. Soc. Scot., 1948.

The insects mentioned include "winter moths"; the damage they cause in orchards is referred to, and control measures are outlined.

2007. BREAKEY, E. P., AND BATCHELOR, G. S.

The orange tortrix, a pest of raspberries in Western Washington.

J. econ. Ent., 1948, 41: 805-6.

Losses caused by the contamination of raspberries intended for processing by the larvae of the orange tortrix (*Argyrotaenia citrana*) are becoming serious in western Washington. Information is given on the life history of the pest, alternate host plants and control measures. Of the insecticides tested at the Agricultural Experiment Station, State College of Washington, dichloro-diphenyl-dichloroethane gave the most promising results.

2008. SCHUH, J., AND MOTE, D. C.

The oblique-banded leaf roller on red raspberries [*Archips rosaceana* (Harris)]. Tech. Bull. Ore. agric. Exp. Stat. 13, 1948, pp. 43, illus.

This insect, which has become a serious pest of red raspberries in the Willamette Valley, Oregon, has a large host range of cultivated and wild plants. It causes damage by getting into the cups of the fruit. In other varieties of cane berries it is of minor importance only. Its life history is described. Twenty-nine parasites have been reared from the pest; of these, 21 are beneficial and the other 8 harmful because they also parasitize beneficial parasites. Control consists of cutting out and burning old canes from November to March and applying DDT dusts or sprays.

2009. VASIĆ, K.

The gradation of polyphagous owl moths in the Nisbava region (Pirote). [Yugoslavian with summary in Russian and French.] Yearb. Fac. Agric. For. Univ. Belgrade, 1948, pp. 346-8.

In 1946 and 1947 observations were made on the developmental stages of owl moths (*Agrotis* spp.), the caterpillars of which attacked garden and industrial crops, and also grapevines, in eastern Serbia. The chief biologic stages were: (1) The caterpillars began to be destructive at the end of March, at first on weeds, but at the time of spring ploughing they began to attack young shoots of cultivated plants. (2) At first they were almost confined to the edges of the fields, the population diminishing towards the centre. (3) Later they congregated in uncultivated areas, e.g. banks of rivers and canals, and hedges. The gradation in population depends on the climatic conditions of spring and autumn. The damage is caused in spring, the pupation in autumn having no practical significance.

2010. SCHMIDT, M.

Die Johannisbeermotte (*Incurvaria capitella* Cl.) in der Westprignitz (Brandenburg). (The currant shoot borer in the province of Brandenburg.)

NachrBl. dtsh. PflSchDienst, 1948, 2: 48-50, bibl. 33.

Control measures are reported against a sudden, severe outbreak of *Incurvaria capitella*, in Germany an almost unknown currant pest. The effect of the mineral oil sprays applied in winter was not known at the time of writing.

2011. CARLSON, F. W., YOTHERS, M. A., AND DEAN, F. P.

DDT, benzene hexachloride and sabadilla to control climbing cutworms on peaches and apricots.

J. econ. Ent., 1948, 41: 655.

DDT sprays and DDT and benzene hexachloride dusts effectively reduced the population of climbing cutworms in a peach orchard near Yakima, Wash. Benzene hexachloride as a spray, and sabadilla as a spray and dust, were also tested but proved ineffective. The small number of worms found beneath the benzene hexachloride-treated trees may be an indication that this material has a repellent effect. The best times and strengths of application have not yet been determined.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2012. HANDFORD, R. H.

The use of DDT in cutworm control.

Canad. Ent., 1947, 79: 2: 36-7 from abstr. in Rev. appl. Ent., 1949, 37: 126.

Treatment with DDT for cutworm (mostly *Euxoa ochrogaster*) control is more expensive than poison baits, but the results obtained suggest that a thorough application of DDT will kill cutworms that appear above ground for too short a time to take bait, and that it remains effective for a much longer period. It may also be effective against climbing cutworms that spend little time on the ground. On the other hand, despite the variable results obtained by some growers with poison bait, this should still be used for controlling early stages and especially for eliminating infestations before the crop appears.

2013. LIEBSTER, G.

Neue Ergebnisse in der Bekämpfung der Apfelsägewespe (*Hoplocampa testudinea* Kgl.). (New results obtained in the control of apple sawfly.)

Anz. Schädlingssk., 1949, 22: 39.

E605 at concentrations of from 0.025% upwards gave excellent results. Lead arsenate and two proprietary insecticides were satisfactory. Observations on winter moth control are also recorded. O.J.

2014. KUENEN, D. J., AND VAN DE VRIE, M.

De bestrijding van de appelzaagwesp. (Control of apple sawfly.) [English summary ½ p.]

Meded. Dir. Tuinb., 1949, 12: 109-19.

In experiments carried out in Zeeland in 1948 effective control was obtained with HCH. The best time for spraying is between petal fall and the appearance of the first larvae. One thorough application should suffice. If the trees have to be sprayed a second time, to control migration larvae, a spray containing nicotine is recommended.—Laboratorium van Zeelands Proeftuin, Wilhelminadorp (Zld.).

2015. KOTLIAR, L. M.

The short pear sawfly. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 4, pp. 15-16.

An account is given of the life history of, and the damage caused by, the short pear sawfly (*Micronematus abbreviatus* Hort.) first recorded in the Crimea in 1947. It eats the leaves and in this way differs from the pear fruit sawfly. Control measures which have been found effective are ploughing the ground in autumn or winter and again in spring, and then [in the middle of April in a trial described] applying DDT dust to the soil in the area corresponding to the spread of the treated tree.

2016. NAJJAR, H.

Controlling the plum sawfly. [Arabic, English summary $\frac{1}{2}$ p.]

Circ. Ext. Serv. Minist. Agric. Damascus 38, 1949, 11 pp.

The plum sawflies (*Hoplocampa flava* and *H. minuta*) heavily infest early flowering plums (mainly Japanese plums), greengage, and early flowering pears. As much as 90% infestation has been observed. For control 50% wettable DDT at 0.25% strength plus a spreader is recommended, the first application at complete petal fall on Japanese varieties, the second when the shucks have fallen. Pears are sprayed at full bloom and at three-quarters petal fall, but DDT should not be used on pears in bloom, owing to the danger to bees, and quassia should be used instead.

2017. SMITH, L. M., AND KIDO, G. S.

The raspberry leaf sawfly [in California].

Hilgardia, 1949, 19: 45-54, bibl. 3, illus.

The larvae of the raspberry leaf sawfly can be killed by a thorough application of $\frac{1}{2}$ % rotenone dust at 50-75 lb. per acre.

2018. PATERSON, C. R.

Spread of wasp nuisance: need for nest destruction [in New Zealand].

Fruit and Prod., 1949, 3² 8: 22-5, illus.

The life history of wasps is outlined. Reference is made to the comparatively small nests of tree wasps, an Australian species which is now fairly common in orchards in Auckland and Wairarapa districts of New Zealand; the nests can be destroyed by burning them out with a torch or blow-lamp, or by snipping off the twig to which they are attached and dropping the complete nest into a tin half full of boiling water or water on which there is a heavy coating of kerosene.

2019. DE JONG, D. J.

De perethrips (*Taeniothrips inconsequens* Uzel.). (The pear thrips.)

Meded. Dir. Tuinb., 1949, 12: 271-83, illus.

Reference is made to recent serious infestations by the pear thrips in Holland. An account is given of its life history, habits, host plants, economic importance, biology and ecology. Control is discussed under natural enemies and biologic control, cultural and mechanical measures, and chemical methods, e.g. soil treatment, baits, spraying and dusting, particularly with DDT preparations.

2020. NOBLE, M.

Stem eelworm in strawberries.

Nature, 1949, 164: 31-2, bibl. 1.

On a field in Scotland previously cropped to beans and cauliflower, strawberry runner plants which had taken root had a curiously crumpled appearance, many of

the parent plants showing the same symptom to a slighter degree. The trouble was found to be due to an infestation of the buds by the stem eelworm, *Anguillulina dipsaci*. In this case infection was contracted from the soil in the first instance and not from infested runners.

2021. REID, R. D.

Strawberry eelworm.

Scot. Agric., 1949, 29: 51-3.

Normally *Aphelenchoides fragariae* is responsible for the damage in strawberries, but in one case a plantation has been found heavily infested with the stem eelworm, *Anguillulina dipsaci*. The only safe method of eelworm control is propagation from healthy runners. From the point of view of control late planting, either in spring or autumn, is an advantage, since it allows symptoms to become more clearly visible.

Sprays and spraying.

2022. VAN DEN MUIJZENBERG, E. W. B.

Bestrijdingstechniek. (The technique of disease and pest control.)

Meded. Inst. Tuinbouwtech. 5, 1949, pp. 13, being reprint from Maandbl. Landbouw-voord. 6: 3-4: 93-176, bibl. 34.

A historical review of the methods of applying fungicides and insecticides with special reference to recent developments.

2023. RAMSFJELL, T.

Hva sier de norske forsøka om sjukdomskamp i frukt- og baerhagen? (Norwegian trials for the control of fruit diseases.)

Frukt og Baer, 1949, 2: 59-64, bibl. 5.

A summary of the work carried out in Norway from 1921 to 1941 on the control of apple and pear scab, apple mildew, apple rust, brown rot of apple, and magnesium deficiency in apple.

2024. FLECKINGER, J.

Les stades végétatifs des arbres fruitiers en rapport avec les traitements. (The stages of development of fruit trees in relation to disease and pest control.)

Reprinted from Rap. gen. Congr. Pomol. Fr., Angers, 1948, pp. 81-93.

The stages of development of the blossom buds and flowers of apples and pears are described and illustrated by drawings to indicate the periods when control measures should be applied, particularly with reference to sawfly and pear midge.

2025. WILSON, A. R., AND BOYD, A. E. W.

A simple power-operated atomizer for applying small quantities of concentrated spray fluids.

Phytopathology, 1949, 39: 412-14, illus.

Small atomizers were made from 6 x $\frac{3}{4}$ in. boiling tubes, and a convenient source of pressure was obtained by leading the exhaust gases from an automobile to the plots by means of a length of hose pipe.

2026. CHATFIELD, H. W.

What smoke research has shown.

Fruitgrower, 1949, 107: 526.

Notes on the contact and coverage obtained by insecticidal smoke generators and on the factors to be

considered in assessing the value of the various types of generator.

2027. INGERSON, H. G.

Trends in orchard spraying and dusting equipment [in America].

Proc. 89th annu. Meet. Pa. St. hort. Ass. 1948, in *St. hort. Ass. Pa. News*, 1949, 25: 77-84.

The author discusses high-pressure and speed sprayers, dusters, fog generators or aerosol applicators, and mist dusters or concentrate applicators.

2028. HEATH, G. D.

An improved method for the generation of insecticidal smokes.

J. Soc. chem. Ind. Lond., 1949, 68: 41-4, bibl. 2.

The pyrotechnic composition specified below will burn without flame when placed loosely in an open tin; it has an efficiency of about 90%: Thiourea 12%, urea 7.3%, potassium chlorate 25.8%, DDT 54.9%. The formula, with slight alterations, is stated to be applicable to the generation of BHC smokes.

2029. ANON.

A simple dusting machine.

Countryman (Cyprus), 1949, 3: 3: 11-12, bibl. 1, illus.

A description of a home-made duster found useful in Cyprus for applying DDT and Agroicide dusts. It is a slightly modified form of one described in *Agriculture, Lond.*, 1948, 55: 203-7 [see *H.A.*, 18: 1078, 2607].

2030. BURRELL, A. B.

Helicopter dusting.

Amer. Fruit Gr., 1949, 69: 4: 16, illus.

In spring, 1948, a group of apple growers in the Champlain Valley of New York combined to employ a helicopter for sulphur dusting against scab. Coverage in the 5-acre experimental plot is described as "so nearly perfect that practically no spots were present on leaves or fruits to permit secondary infection". In a brief discussion of the economics of the operation it is stated that long rows and large blocks are essential.

2031. TROUVELOT, B., AND OTHERS.

Étude sur les traitements antiparasitaires agricoles par voie aérienne. (Pest and disease control with aeroplanes.)

C.R. Acad. Agric. Fr., 1949, 35: 121-2.

A short account of trials carried out in France with an aeroplane, two types of calcium arsenate dust, differing in fineness, being used.

Fungicides.

2032. PARRIS, G. K., AND STOVER, L. H.

Spraying grapes for disease control in Florida—1945-1947.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 93-4, bibl. 1 [received 1949].

It is recommended as a result of tests that bunch grapes in Florida be sprayed with dithane-zinc-lime instead of with bordeaux. This dithane spray gives good disease control, high yields, and may be applied on almost ripe or ripe fruit without fear of discolouring the grapes.

2033. MILLER, H. J.

Modifications of the slide-germination method of evaluating fungicides including the use of *Venturia inaequalis* and *Phytophthora infestans*.

Phytopathology, 1949, 39: 245-9, bibl. 40.

Standardized procedures were developed for *Venturia inaequalis* and *Phytophthora infestans* in slide germination evaluations of fungicides, and variations in the methods were devised for *Sclerotinia fructicola* and *Alternaria oleracea*.

Insecticides.

(See also 1744, 2102-2106, 2266, 2267, 2341, 2342, 2428, 2429).

2034. FJELDDALEN, J., AND GJOERUM, H. B.

Skadedyr i frukthagen. Endel forsøksresultat. (Spraying trials against fruit pests.)

Norsk Hagetid., 1949, 65: 25-7.

Tabulated results of spraying trials in Norway carried out against winter moth, red spider, apple blossom weevil and other pests.—State Plant Protection Service.

2035. VANETTI, F.

Ligeira orientação sobre o combate químico às pragas das culturas. (A survey of the chemical control of plant pests.)

Rev. Ceres, 1947, 7: 210-34, bibl. 12, illus.

[received 1949].

Plant pests are here classified according to the type of injury they cause and the kind of preparation to be used for their control, viz. I. On flowers, fruit, leaves, buds and shoots—sucking mouth-parts (aphids, coccidae, plant bugs, thrips); II. On flowers, fruit, leaves, buds and shoots—biting mouth-parts, e.g. lepidopterous and dipterous larvae; III. Within fruits, leaves, buds and shoots—biting mouth-parts, e.g. some lepidopterous larvae; IV. Within shoots and stems in galleries more or less extensive—biting mouth-parts, e.g. some coleopterous larvae; V. On subterranean parts—sucking mouth-parts; VI. Within and on the surface of seeds and stored products; VII. On aerial and subterranean parts of plants—biting mouth-parts, e.g. termites. Formulae are given for preparations to be used in particular cases.

2036. PRADHAN, S.

Studies on the toxicity of insecticide films.—Preliminary investigations on concentration-time-mortality relation.

Bull. ent. Res., 1949, 40: 1-25, bibl. 27.

Experiments are described in which the concentration-time-mortality relationships with certain insects were investigated for the insecticides DDT and γ -BHC, the insecticides being used in film form.—Rothamsted Exp. Stat.

2037. MARSHALL, J.

Oil spray investigations in British Columbia.

J. econ. Ent., 1948, 41: 592-5, bibl. 2.

"In 1939 the British Columbia Fruit Board, the Dominion Division of Chemistry, and the Dominion Division of Entomology undertook an investigation of various petroleum fractions and blends with the object of setting up a reliable basis for selection of

spray oils for local conditions." This paper is a progress report of field work. Some adaptations of dormant and summer oil specifications for European red mite, apple mealybug and San José scale to meet British Columbian conditions, are discussed. Results so far obtained show that there is need for basic research on the action of spray oils.

2038. LIEBSTER, —.

Erlauben uns die neuartigen Kontakt-Insektizide die Einsparung der Winterspritzung im Obstbau? (Are the new contact insecticides a substitute for winter washes?) *NachrBl. dtsh. PflSchDienst*, 1948, 2: 80-2.

In small-scale trials in Oldenburg two well-timed pre-blossom applications of E605 achieved very satisfactory control of winter moth, apple sucker and apple capsid, the first-named being the most important apple pest of that area. The treatment was superior to winter wash plus two applications of either Gesarol or benzene hexachloride.

2039. PETERSON, P. D.

Field experiences with new insecticides and fungicides in apple and peach orchards.

Proc. 89th annu. Meet. Pa St. hort. Ass. 1948, in *St. hort. Ass. Pa News*, 1948, 25: 70-6.

Some observations and conclusions following the use of DDT against codling moth; summer oil, xanthone (genicide), DN-111 and hexaethyl tetraphosphate against mites on apple; various fungicides, including Elgetol and Fermate, on apple; benzene hexachloride on peach.

2040. KNUDSEN, P.

Et patenteret dansk plantebeskyttelsesmiddel. (A new Danish insecticide.)

Dansk Havebr., 1949, 8: 116-17.

Apart from being a strong respiration poison, the new insecticide Midol contains a cellulose derivative, which softens the chitin layer, and the halogen derivative of a hydro-carbon compound which dissolves the wax layer. As a result of this action contact insecticides mixed with Midol are effective at lower concentrations, which is especially important in a combination with the toxic parathion marketed as Midol-Tio. Midol A containing pyrethrum and "666" has already been officially recognized for the control of aphids and apple and plum sawfly, but it is reported to be effective also against tortrix moth, winter moth and other larvae. Midol B has azobenzene as an additional constituent.

2041. LEPAGE, H. S., GIANNOTTI, O., AND ORLANDO, A.

R.B.1018—um novo inseticida. (R.B.1018—a new insecticide.) [English summary 1 p.]

Arq. Inst. biol. S. Paulo, 1947-48, 18: 1-29, bibl. 8, illus.

The insecticidal action of R.B.1018, an organic derivative of phosphorus, was tested on several species of insects at the Biological Institute, S. Paulo, Brazil. R.B.1018 is both a contact insecticide and a stomach poison, and was found to be effective against the potato beetle (*Epicauta* sp.), the cabbage worm (*Ascia monuste orseis*), the Mediterranean fruitfly (*Ceratitis capitata*),

and leaf cutting ants (*Atta* spp.). No injury was observed on plants sprayed with a 1:5,000 emulsion, a higher concentration than was required for control of most of the insects tested.

2042. MARTIN, H.

The insecticidal properties of certain organophosphorus compounds.

Ann. appl. Biol., 1949, 36: 153-5, bibl. 12.

This article includes notes on systemic insecticides and on the very poisonous properties of some of them. "The known systemic insecticides are so closely related to compounds of high and dangerous physiological activity that the greatest caution must be taken before any are recommended for practical use."—Research Station, Long Ashton, Bristol.

2043. FULTON, R. A., AND OTHERS.

Particle size and toxicity of aerosols affected by HETP concentration.

Agric. Chemls, 1949, 4: 1: 35-8, 67, bibl. 4.

A study was made with several concentrations of hexaethyl tetraphosphate in methyl chloride to determine the effect of the concentration on the average particle size, on its efficiency in control of insects, and on the injury to plants. The physical properties of the hexaethyl tetraphosphate aerosols were such that of the dosages tested, the largest percentage of the fine particles (10 microns or less) were produced by a 1% aerosol, and progressively fewer fine particles by 5%, 10%, or 20% aerosols. In a study on phytotoxicity, injury to the tomato variety Italian Salad was associated with aerosol particles 20 microns or more in diameter. On the basis of these studies the most dilute aerosols, which produced the finest particles, give the most efficient pest control and the least plant injury. Heating the more concentrated aerosols or increasing the pressure with carbon dioxide does not eliminate the larger particles responsible for plant injury. [From authors' summary.]

2044. DEFFNER, M., AND AUGUSTIDES, D.

Insecticidal power and microscopical structure of residual films of phenyl-isonitrile and benzene hexachloride.

Nature, 1948, 163: 769, bibl. 1.

The investigation was carried out in connexion with a study of insecticides for the control of the pistachio nutworm (*Eurytoma pistaciae*) and the pistachio tree leafhopper (*Idiocerus pistaciae*).

2045. BOTTGER, G. T., YERINGTON, A. P., AND GERTLER, S. I.

Preliminary tests of certain phenylhydrazides as insecticides.

[Publ.] *U.S. Dep. Agric. agric. Res. Administ. Bur. Ent. Pl. Quar.* E-769, 1949, pp. 10, bibl. 1.

Results of the application of 25 named, chemically related, compounds derived from phenylhydrazine on 19 test insects at Anaheim, Calif., are recorded.

2046. MAYER, E. L., AND OTHERS.

Nicotine insecticides. Part V—Search for synergists.

[Publ.] *U.S. Dep. Agric. agric. Res. Administ. Bur. Ent. Pl. Quar.* E-768, 1949, pp. 16, bibl. 9.

This paper is a continuation of previous studies to

find compounds that might replace part of the nicotine, and presents results obtained with 107 additional materials. Each sample contained 5% of adjunct plus only 2% of nicotine as sulphate. Several species of lepidopterous larvae, three species of aphids, and the large milkweed bug were used as the test insects. Adjuncts listed in table 1 show possible synergism and will be subjected to further tests.

2047. HUFFAKER, C. B.

A technique for translocation of DDT in plants.

J. econ. Ent., 1948, 41: 650, bibl. 3.

A technique is described by which DDT can be introduced to the inner tissue of leaves without any surface treatment whatever. This technique was used to determine whether the build-up of two-spotted mite on DDT-treated plants was due to an increase in fecundity of the mite as well as to the destruction of predators. No increase in fecundity was observed. Bean leaves were used.

2048. ZUSSMAN, H. W.

Factors involved in sequestering 2,4-D.

Agric. Chemls., 1949, 4: 4: 27-9, 73.

The use of hard water for the dilution of 2,4-D and certain fungicides and insecticides should be avoided. The action of the organic water softening agent, Sequestrene AA, which consists of ethylenediamine tetracetic acid, is described.

2049. FAHEY, J. E., AND RUSK, H. W.

A leaf punch for sampling insecticide residues on foliage.

[Publ.] *U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar.* ET-264, pp. 2, bibl. 2, illus.

Instructions are given for making a leaf punch from a pair of pliers with parallel-action jaws (Bernard pliers). It is shown assembled, and dismantled.

Insecticidal plants.

(See also 2617.)

2050. THORPE, H. C.

Breeding better pyrethrum [in Kenya].

Pyreth. Post, 1948, 1: 2: 12-15.

A brief review of the subject. Objects and methods are considered, and past, present, and future work outlined.

2051. CHANDLER, S. E.

The origin and early history of the production of pyrethrum in Kenya.

Pyreth. Post, 1948, 1: 1: 10-11.

In the short period of 20 years the Kenya highlands have become the most important source of pyrethrum in the world. Exports in recent years amounted to approximately 6,000 tons of dried flowers per annum. Brief notes are given on the experimental work of Gilbert Walker who, with the assistance of other workers, laid the foundation of the industry.

2052. TATTERSFIELD, F.

Early experiments on pyrethrum growing in England.

Pyreth. Post, 1948, 1: 1: 3-8, illus.

The author shows the connexion of these experiments with pyrethrum growing in the British Empire.

2053. COOMBER, H. E.

The chemical evaluation of pyrethrum flowers.

Pyreth. Post, 1948, 1: 1: 16-19.

A note on the efforts being made to establish an international method. Details of the Seil method of analysis are given.

2054. CHITTENDEN, A. E., AND COOMBER, H. E.

Pyrethrum flowers from Ceylon.

Bull. imp. Inst. Lond., 1948, 46: 230-1.

A report on a sample, the chemical examination of which showed it to be similar to Kenya-grown flowers in total pyrethrin content.

2055. ATCHISON, E.

Studies in the leguminosae. III. Cytological studies of *Lonchocarpus* and *Derris* species.

Amer. J. Bot., 1949, 36: 364-8, bibl. 12, illus.

A cytological study of 9 species of *Lonchocarpus* and 4 species of *Derris*. Rotenone production in *lonchocarpus* apparently increases with polyploidy. No correlation has yet been discovered in *derris*.—University of North Carolina, Chapel Hill.

2056. JONES, M. A., AND PAGAN, C.

Experiments in the drying of *derris* and *lonchocarpus* roots.

Trop. Agriculture Trin., 1947, 24: 88-93, bibl. 4 [received 1949].

It is shown that sun-drying of *derris* and *lonchocarpus* is more practical than shade-drying because the rate of drying is faster in the sun and no degradative changes occur. Slow drying, as simulated by storage of undried root, leads to the loss of rotenone. Two constructions are described for sun-drying roots. [From authors' summary.]

2057. HEAL, R. E.

***Ryania* insecticides.**

Agric. Chemls., 1949, 4: 5: 37-9, 89-91, bibl. 26.

Brief notes are given on the discovery and development, sources of supply, activity, toxicology, pharmacology, chemistry, and physiological effects of *Ryania* insecticides. The principal source of supply has been the stem wood of *R. speciosa*, native to Trinidad.

Soil fumigants.

(See also 1749, 2281, 2282.)

2058. BICKERTON, J. M.

Observations of certain factors governing efficacy of soil fumigants.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 114-16 [received 1949].

A short general discussion touching on spacing, depth of application, penetration, soil temperature and moisture, soil type, and rates of application.

2059. VAN KOOT, Y., AND BAKKER-BEER, E.

Factoren, die invloed uitoefenen op de resultaten van het stomen van grond. (Factors influencing the effect of soil steaming.) [English summary ¾ p.] *Meded. Dir. Tuinb.*, 1949, 12: 120-33, bibl. 7.

The chief factors affecting the results obtained from soil steaming are humus content of the soil, whether or not the soil has been previously steamed, and degree of steaming, i.e. thorough or light.

2060. McCLELLAN, W. D., CHRISTIE, J. R., AND HORN, N. L.

Efficacy of soil fumigants as affected by soil temperature and moisture.

Phytopathology, 1949, 39: 272-83, bibl. 12, illus.

Tests were made with Larvacide, D-D, Dowfume G, and Dowfume W-15 against the root-knot nematode *Heterodera marioni*, the aster wilt fungus *Fusarium oxysporum* f. *callistephi*, and *Sclerotium rolfsii* at two soil moisture levels and six soil temperatures varying from 45° to 101° F., and the results are tabulated. In general the fumigants were most effective in wet soils, and they were retained longest in the wet, low-temperature soils.—Plant Industry Station, Beltsville, Maryland.

Noted.

2061.

a ANON.

La lutte contre le ver de la vigne de seconde generation. (Control of the second generation of the *Cochylis* vine moth.) *Def. Vég.*, 1947, No. 43, p. 1, illus.

b BOTTGER, G. T., AND GERTLER, S. I.

Preliminary tests on N-substituted *m*-nitrobenzamides as insecticides.

[Publ.] U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar. E-773.

In laboratories at Sanford, Fla. and Anaheim, Calif.

c CANADA DEPARTMENT OF AGRICULTURE, DIVISION OF PLANT PROTECTION SCIENCE SERVICE.

Consolidated and revised regulations of the destructive insect and pest act [Canada.] 1949, pp. 10.

d CROOME, V.

A further note on the separation and deterioration of the components of pyrethrum flowers.

E. Afr. agric. J., 1949, 14: 146-7, bibl. 1.

e GOLDSWORTHY, M. C.

Development and progress in new fungicides. *Agric. Chemls*, 1949, 4: 3: 33-5, bibl. 19.

f HAGEMAN, R. H.

Rapid method for extracting constituents of derris roots.

Analyt. Chem., 1949, 21: 530, bibl. 3.

g JANCKE, O., AND ARNOLD, E.

Stand der San-José-Schildlaus-Verseuchung und -Bekämpfung in der Pfalz im Frühjahr 1948. (Incidence and control of the San José scale in the Palatinate in spring 1948.) *NachrBl. dtsh. PflSchDienst*, 1948, 2: 77-80.

h KLINKOWSKI, M.

Penicillin und Streptomycin in der Pflanzen-therapie. (Penicillin and streptomycin in plant therapy.)

NachrBl. dtsh. PflSchDienst, 1948, 2: 114-17, bibl. 20.

A review of the literature.

i LANGFORD, G. S., AND CORY, E. N.

Host preference in Japanese beetles with special reference to grape and apple.

J. econ. Ent., 1948, 41: 823-4.

j LINDQUIST, A. W., AND OTHERS.

Screening tests for materials to increase the effectiveness of a DDT-pyrethrum formula.

[Publ.] U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar. E-775, 1949, pp. 51.

k LITTLE, E. L., JR.

Heliopsis longipes, a Mexican insecticidal plant species.

J. Wash. Acad. Sci. 1948, 38: 269-74 (*Brit. Abs.* 1949, BIII, p. 24).

l MAYER, K.

Die Bedeutung des Klimas bei der Entstehung von Epidemien unserer Kulturpflanzen. (The significance of climate in the origin of epidemics of cultivated plants.) *NachrBl. dtsh. PflSchDienst*, 1948, 2: 51-4, bibl. 16.

m MILLS, G. B.

A biochemical study of *Pseudomonas prunicola* Wormald. 1. Pectin esterase. *Biochem. J.*, 1949, 44: 302-5, bibl. 8.

n MOSSOP, M. C.

Termites in gardens and orchards [in S. Rhodesia].

Rhod. agric. J., 1949, 46: 17-19, bibl. 2, being *Ent. Advis. Circ.*, Dep. Agric. 2. Deals with some preventive and control measures.

o POTTER, C.

Modern insecticides and methods of application for plant protection.

J. roy. agric. Soc., 1948, 109: 175-93, bibl. 121.

p RAMSFIJELL, T.

Sprøyteskade. (Spray injury in apples.)

Frukt og Baer, 1949, 2: 14-21, bibl. 11. A review of the literature.

q SCHMIDT, E.

Bekämpfung der Pfirsichblattlaus mit E605. (The control of the green peach aphid with E605.)

Höfchen Briefe, 1949, 2: 1: 32-5.

r SCHMIDT, T.

Das Auftreten wichtiger Krankheiten und Schädlinge an Kulturpflanzen in Österreich im Jahre 1948. (The incidence of important diseases and pests of cultivated plants in Austria in 1948.)

PflSch. Ber. Wien, 1949, 3: 48-54.

- S SIEGLER, E. H., AND GERTLER, S. I.
Laboratory tests of N-substituted m-nitrobenzamides against the codling moth.
J. econ. Ent., 1948, 41: 658-9.
When compared with DDT not promising.
- t SIMONDS, A. O.
Apricots and plums as hosts of Western X-disease.
Science, 1949, 109: 199, bibl. 3.
- u STATENS FØRSØGSVIRKSOMHED I PLANTEKULTUR.
Sygdomme og skadedyr paa solbaer.
(Diseases and pests of black currants.)
Dansk Havebr., 1949, 8: 89-90, being
Medd. Statens Førsøgsvirks. Plante kult. 439.
- v STATENS FØRSØGSVIRKSOMHED I PLANTEKULTUR.
Sygdomme og skadedyr på stikkelsbaer.
(Diseases and pests of gooseberries.)
Erhvervsfrugtaavl., 1949, 15: 218-20.
- w TRIVELLI, G.
Influence des pressions et de la mouillabilité sur la nature des dépôts de bouillies cupriques commerciales. (The influence of pressure and wetting capacity on the nature of commercial copper spray deposits.)
Rev. romande Agric. Vitic., 1949, 5: 41-3.
- x TURNER, W. F.
Insect vectors of phony peach disease.
Science, 1949, 109: 87-8, bibl. 1.
- y VITORIA, E. R., CERESA, M. C. D., AND LASSALLE, A. J. A.
Metodo para valorar el ataque de la "Peronospora" de la vid. (A method of determining the intensity of attacks of vine *Peronospora*.) [English summary.]
Rev. Invest. agric. B. Aires, 1947, 1: 261-8.
- z WOODSIDE, A. M.
Tetraethyl pyrophosphate for control of the periodical cicada [in orchards].
J. econ. Ent., 1948, 41: 722-4.

WEEDS AND WEED CONTROL.

General.

(See also 2132, 2459, 2599, 2600, and Reports.)

2062. AGRICULTURAL INSTITUTE OF CANADA.

Weeds and Canadian agriculture.

Agric. Inst. Rev., 1949, 4: 79-156, bibl., illus.

This series of 19 articles, written by specialists for the layman and grower, was compiled with the co-operation of the National Weed Committee of Canada. Most of the articles concern agricultural problems. Those of general or horticultural interest include the following. Regional weed problems (pp. 79-86). An evaluation of the weed problem in the Maritime provinces, Quebec and Ontario, and the Prairie provinces.—Persistent perennial weeds (pp. 99-101). The characteristics of such weeds in general, and the measures that are being taken to eradicate leafy spurge and field bindweed in particular are described.—Community organization for weed control (pp. 115-17).—Provincial Weed Legislation (pp. 119-24).—A classification of herbicides (pp. 128-9). A useful table classifying chemical herbicides into soil sterilants, soil fumigants, contact herbicides and growth regulators, and giving the uses, methods of application and costs of each.—Plant competition and weed control (pp. 139-45).—Research and weed control (pp. 146-9).—Weed surveys in Canada (pp. 150-2).

2063. VAN ZYL, J. P.

Chemical services for the State.

Fmg S. Afr., 1949, 24: 79-81.

A divisional report of the Department of Agriculture for 1948, which includes the following brief reference to herbicides: Organic compounds such as hormones and other organic materials, which were prepared synthetically in the laboratory, were applied in various ways to approximately 50 different kinds of weed to test their herbicidal powers. Simultaneously, physiological observations were made to establish how the destructive process takes place in the plant cell.

2064. NORTH CENTRAL WEED CONFERENCE

[U.S.A.].

Policy Committee Report.

Agric. Chemls, 1949, 4: 2: 37-41, 71-3.

The report is based on information accumulated in 1948 by the Research Committee of the North Central Weed Control Conference. Subjects dealt with include: Control of individual annual and perennial weed species, pre-emergence use of 2,4-D, chemical weed control in horticultural crops—where it is an aid to, and not a substitute for, cultivation—and in potatoes, control of woody plants, and a discussion of some new herbicides.

2065. TINCKER, M. A. H.

An introduction to the evaluation of selective weedkillers.

TEMPLEMAN, W. G.

Laboratory methods and trials leading up to the field use of selective weedkillers.

WOODFORD, E. K.

The evaluation of selective phytocidal action in field trials.

HAMENCE, J. H.

Determination of selective weedkillers in soils, etc.

Chem. Industr., 1949, No. 11, p. 173.

Short abstracts of papers read before the Agriculture Group of the Society of Chemical Industry in February, 1949.

2066. WURGLER, W.

Recherches sur l'action herbicide du 2,4-D sur trois mauvaises herbes infestant nos cultures: le liseron des champs, le chardon et le lampé. (The control of three important weeds with 2,4-D: lesser bindweed, creeping thistle and broad dock.)

Rev. romande Agric. Vitic., 1949, 5: 26-8, bibl. 6.

Experimental data on the control of *Convolvulus arvensis*, *Cirsium arvense* and *Rumex obtusifolius*.

2067. MARTH, P. C., HARDESTY, J. O., AND MITCHELL, J. W.
Stability of 2,4-D when stored with mixed fertilizer.

Agric. Chemls, 1949, 4: 5: 41, 82.

Trials carried out at Beltsville, Md, show that fertilizer mixtures containing 2,4-D (acid) may be stored for 10 months without seriously affecting their herbicidal potency.

2068. STEWART, W., AND GAMMON, C.
A back-pack fog gun for 2,4-D application.
J. econ. Ent., 1948, 41: 658.

"The high degree of portability of the fog gun suggests its use for 2,4-D weed control in drainage canals, meadows and other sites not accessible to heavier equipment or some distance from a water source."

In vegetable crops.

2069. LACHMAN, W. H.
Weed control in vegetable crops.
Bull. Mass. agric. Exp. Stat. 451, 1948, pp. 60, bibl. 165.

A comprehensive discussion of the literature is followed by brief recommendations (2 pp.) on the chemicals to be applied for the control of weeds in 20 vegetable crops.

2070. BURGIS, D. S.
Chemical control of weeds in vegetable seedbeds.
Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 111-14, bibl. 12 [received 1949].

Experiments on weed-infested soils (sandy and heavy) in Florida are reported from which it is concluded that Uramon+cyanamid is effective as a herbicide. Regardless of type of irrigation, seed should not be sown for at least 6 weeks after treatment. Chloropicrin was stimulative in its effect on tomato (though not significantly so) and celery plants. It gives adequate control of all native weeds other than crabgrass. Best results are obtained by planting 2 weeks after treating the seedbed. The ammonium salt of 2,4-D cannot be recommended as a herbicide for vegetable seedbeds.

2071. GREULACH, V. A., AND SINGH, S.
Some effects of nonherbicidal concentrations of 2,4-D on the development of the bean plant.
Science, 1949, 109: 336-7, bibl. 8.

Preliminary experiments are reported which confirm and extend previous observations on the morphological effects of 2,4-D on beans and on its delaying and inhibiting effect on reproductive development. No hastening of maturity or increase in yield, as reported by some workers, was found.

2072. BURGIS, D. S., AND BECKENBACH, J. R.
Herbicides for control of weeds in vegetable seedbeds also control root-knot.
Proc. Amer. Soc. hort. Sci., 1948, 52: 461-3, bibl. 6.

Tests at Florida Agricultural Experiment Station, Bradenton, in 1947 on vegetable seedbeds indicate that chloropicrin, Uramon+cyanamid and 2,4-D were effective in root-knot control. Chloropicrin had a

more rapid action, but its cost and the difficulty encountered in handling would make the cheaper, slower acting materials more desirable if the results obtained in the test can be substantiated.

2073. HAGSAND, E., AND VÄÄRTNÖU, H.
 Hormonderivat i kampen mot ogräs. VI and VII. (Weed control by hormone derivatives. VI. The effect on cultivated plants in the 1948 trials. VII. The effect on weeds in the 1948 trials.) [English summaries pp. 2 and 1 respectively.]
Växtodling (Skrift. Inst. Växtodl. kungl. LantbrHögsk.) 4, 1949, pp. 8-30, bibl. 7, and pp. 31-8, bibl. 3.

The experimental crops included peas which are liable to severe damage unless sprayed very early. Methoxone appears to be the substance best suited to the purpose. In the second paper the effect of the treatment on a number of persistent weeds and on the viability of their seeds is discussed.

2074. WURGLER, W.
 Dangers des traitements herbicides aux acides phénoxyacétiques substitués pour certaines plantes maraichères. (The susceptibility of certain market garden crops to herbicides of the substituted phenoxyacetic acid type.)
Rev. hort. suisse, 1949, 22: 105-11, bibl. 8.

Of the market garden crops tested only asparagus and strawberry were practically resistant to applications of substituted phenoxyacetic acid herbicides at a concentration not exceeding 0.2% of the active substance. If weeds of uncultivated soil are to be controlled, the treatment must be carried out at least 6 weeks before planting. In the absence of rain the soil should be cultivated and watered at the beginning of the fourth week to accelerate the decomposition of the chemical. Bean and cress seedlings sown in pots of treated soil will disclose any residual toxicity.

2075. SELL, H. M., AND OTHERS.
Changes in chemical composition of the stems of red kidney bean plants treated with 2,4-dichlorophenoxyacetic acid.
Plant Physiol., 1949, 24: 295-9, bibl. 13.

A decrease in fibre and sugar content and an increase in total proteins, ether extract and ash content was found in plants treated with 2,4-D. A physiological explanation of these differences is offered.

2076. BLACKMAN, G. E., AND IVENS, G. W.
Selective weed control in carrots and related crops [using mineral oils].
Agriculture, 1949, 56: 58-61.

An account of some experiments with light mineral oil fractions begun in England in 1945, following similar work in America and Australia. Optimum results were obtained by using 15-20% by volume of an 85% aromatic kerosene extract (specified) and 80-85% of either of two low aromatic kerosenes (specified). A list is given of those annual weeds which are found relatively susceptible to oil spray treatment. It is not safe to spray carrots before they possess at least two true leaves, and spraying should cease before the plants

have developed tap roots as thick as a lead pencil, otherwise traces of oil will persist till harvest and taint the roots. Present indications are that 70-100 gal. of oil are needed per acre where the whole area is sprayed, less if only the rows are sprayed, leaving the inter-rows for the hoe. Rubber diaphragms, hoses, and tanks with rubber linings will be attacked by the oils unless they are made of special oil-resistant mixes.

2077. JÄGERSTÅHL, G.

Försök med dinitrobutylfenol som ogräsbekämpningsmedel. (Herbicide trials with dinitro-sec. butylphenol.) [English summary $\frac{3}{4}$ p.]

Växtodling (Skrift. Inst. Växtodl. kungl. LantbrHögsk.) 4, 1949, pp. 39-48, bibl. 4.

The herbicide was applied to a pea crop at rates of 2.5, 4.0, 5.5 and 7.0 litre/hectare. The two intermediate rates proved successful for the control of weeds, especially *Stellaria media* and *Fumaria officinalis*, without damaging the peas, while the highest concentration caused injury.

2078. ROLAND, M.

Isopropylfenylkarbamat mot flyghavre och kvickrot. (The control of wild oats and couch grass by isopropylphenyl carbamate.) [English summary $\frac{3}{4}$ p.]

Växtodling (Skrift. Inst. Växtodl. kungl. LantbrHögsk.) 4, 1949, pp. 49-58, bibl. 8.

Ten kg/hectare or 60 litre/hectare of IPC applied to the soil immediately before sowing peas suppressed wild oats without injuring the crops. Pea yields increased by 10-35% as a result.

2079. HYLMÖ, B.

Ogräsbekämpning med högtrycksspruta i konservärter. (Weed control in canning peas with high-pressure spraying.) [English summary $\frac{1}{4}$ p.]

Växtodling (Skrift. Inst. Växtodl. kungl. LantbrHögsk.) 4, 1949, pp. 59-64.

Agroxon applied at the rate of 3.5 litre in 400 litre/hectare was as effective as 7.5 litre in 1,000 litre water. In both cases pea yields were reduced.

2080. WOLF, D. E., ENGEL, R. E., AND AHLGREN, G. H.

Chemical crabgrass control.

Minn. Hort., 1949, 77: 76-7, condensed from Agric. Chemls, November, 1948.

A review of preliminary results obtained at several U.S.A. experiment stations on the control of crabgrass (*Digitaria* sp.) in turf and arable crops. In potatoes pre-emergence treatment with 2,4-D seems to be a "distinct possibility".

2081. DANIELSON, L. L.

Weeding Irish Cobbler potatoes with 2,4-D.

Amer. Potato J., 1949, 26: 1-7, bibl. 3.

At the concentrations used treatment at an early stage was injurious to the plant and at a later stage ineffective against weeds. Pre-emergence applications are envisaged as a possible solution for weed control in autumn crop potatoes.—Virginia Truck Experiment Station, Norfolk.

In ornamental crops.

2082. WYATT, F. M.

The problem of moss in lawns.

Gdnrs' Chron., 1949, 125: 170.

Experiments at Tilgate Horticultural Station, Surrey, show that a single application of a very small amount of mercurous chloride (calomel) will effectively eliminate moss in lawns for at least 12 months. [Appropriate doses are not stated.]

2083. GIANFAGNA, A. F.

Gladiolus weed control.

Bull. N. Y. St.-Flower Gr. 43, 1949, pp. 2-3, illus.

Preliminary trials with potassium cyanate, phenyl mercuric acetate and 2,4-D, alone and in combination, for control of crabgrass and broad-leaved weeds in gladiolus fields are reported from the Ornamentals Research Laboratory, Farmingdale, L.I. Potassium cyanate as a post-emergence spray at 75-150 lb. per acre gave excellent control of all weeds, but at this rate it is too expensive for commercial use. Phenyl mercuric acetate gave good control of crabgrass.

In tropics and sub-tropics.

2084. CRAFTS, A. S., AND EMANUELLI, A.

Erradicacion de yerbajos. (Eradication of weeds.)

Bol. Estac. exp. agric. Puerto Rico, 82, 1948, pp. 30.

A survey of modern methods of weed control and the use of herbicides in Puerto Rico.

2085. RIPPERTON, J. C., AND FUKUNAGA, E.

Chemical control of noxious weeds [in tropics].

Bien. Rep. Hawaii agric. Exp. Stat. 1946-48, 1948, pp. 33-4.

The following conclusions were drawn from preliminary experiments. *Cactus*: Of the materials tried, 2,4-D appears to be the most effective. Either the sodium salt or the ester may be used. Concentrations of 0.5 to 1% of the acid are required. Injections of the solution into the lobes of the plant have only a localized effect. Spraying the solution on both sides of each lobe is necessary. New shoots develop from the treated plant even though only slight fragments of live tissue remain, so that more than one treatment is required. *Joea* (*Stachytarpheta cayennensis*): can be readily controlled by 2,4-D. A single spraying with solutions containing about 0.1% 2,4-D is sufficient to kill even mature plants. *Guava*: This serious pest appears to be fairly susceptible to 2,4-D. Young plants are usually killed by spraying the leaves with a 0.5% water solution of 2,4-D. Recent experiments in which a 5% oil solution of the ester of 2,4-D was applied to the trunks of old large trees indicate good possibilities with this treatment. It seems probable, however, that several sprayings would be necessary to kill the underground stems and roots in an old and well-established stand. Similar treatment of opiuma, lantana, Christmas berry, and klu were effective in killing most of the plant, but in most instances new growth from the base appeared.

2086. JOHNSTON, J. C., AND SULLIVAN, W.

Eliminating tillage in citrus soil management.
Circ. Calif. agric. Ext. Ser. **150**, 1949,
pp. 16, bibl. 4, illus.

The pros and cons of cultivation *versus* no cultivation in citrus orchards has been much discussed by growers in recent years. This circular gives a digest of information available on the subject in California, where about 50,000 out of 330,000 acres of citrus "are under the system of no cover crop and no tillage". The methods employed under this system, the equipment needed, the results obtained, and the costs involved are discussed. The older systems of winter cover cropping with summer tillage and of permanent cover cropping without tillage are referred to more briefly. The system whereby cover crops and tillage are eliminated came with the advent of oil and chemical herbicides. The herbicide most commonly used is ordinary orchard heater oil, alone or diluted with water. If diluted it is frequently fortified with special weed oils, or with sulphur, dinitro compounds, or chlorinated phenols. The following formula for a fortified oil emulsion concentrate is given: aromatic distillate (40% or more aromatics, viscosity 50 sec. or less) 30 lb., penta-chlorophenol 2 lb., Oronite wetting agent 2 lb. Add 96 gal. water to make up a spray for use on young weeds. Use less water for more resistant weeds. In most cases it is best to use a boom sprayer which will treat a whole interline at a time. This can be operated by one man and will cover 3 acres per hour. Booms should be provided with shields, to reduce fog and to lift low branches. A young orchard, where most of the area must be sprayed, will require about 75 gal. of spray per acre and about 11 man-hours to apply it. Several types of sprayer, large and small, are illustrated. No adverse effect on the soil has been observed from oil spraying. Figures are quoted from which it appears that the no tillage system, using herbicides, costs about one-third more in the first two years, the same in the third year, and 50% less after that year than ordinary conventional tillage. The frost hazard may be reduced in orchards which are not tilled.

2087. LARUE, R. G.

Clean culture of citrus orchards [using oil sprays] in San Bernardino County [California].
Calif. Citrogr., 1948, **33**: 334, 348 [received 1949].

The practice of using oil sprays for controlling weeds in Californian citrus orchards has increased greatly in recent years. In San Bernardino county alone the area thus treated was estimated at 10,000 acres by the end of 1948. Some advantages claimed for the system are enumerated.

2088. MERCER, A. D.

Control of water hyacinth (*Eichhornia crassipes*) in the Rewa Delta [Fiji].
Agric. J. Dep. Agric. Fiji, 1948, **19**: 72-3.

Mainly concerned with the cost of spraying 30 miles of waterway with a 2,4-D type of herbicide. Two treatments of 1½% weedone were given, the first of which resulted in a kill of about 75%. The average cost per mile for the two treatments combined was £5, the cost per acre of weed treated being about the same.

Noted.

2089.

a ÅBERG, E.

Hormonderivat i kampen mot ogräs. VIII. Översikt över resultaten från åren 1946 till 1948. (Weed control by hormone derivatives. VIII. A survey of the results obtained from 1946 to 1948.) [English summary pp. 3.]
Växtodling (Skrift. Inst. Växtodl. kungl. LantbrHögsk.) **4**, 1949, pp. 73-123.
Includes as well a discussion of herbicides not of the hormone type.

b PETERSEN, H. I.

Nogle Ukrudtsplanter Udbredelse og Betydning i Danmark. (Distribution and significance of certain weeds in Denmark.) [English summary 12 ll.]
Tidsskr. Planteavl, 1949 (?), **52**: 460-83.

c WOLF, D. E., AND ENGEL, R. E.

Killing turf weeds with chemicals.
Circ. N.J. agric. Exp. Stat. **513**, 1948,
pp. 4, illus.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

General.

(See also 1724, 1732, 1929, 2058-2060, 2062-2081, 2591, 2594.)

2090. VENNESLAND, B.

The β -carboxylases of plants. II. The distribution of oxalacetic carboxylase in plant tissues.
J. biol. Chem., 1949, **178**: 591-7, bibl. 5.

With only a few exceptions the crude oxalacetic carboxylases used in this study were prepared from cultivated vegetable plants.

2091. NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING.

Douglas automatic gapper [for row crops].
Agric. Engng Rec., 1949, **2**: 219, illus.

A short report dated May, 1948, on a test of a hand-propelled machine having four equally spaced curved blades, 8 in. long and 1½ in. apart, mounted on a spider that revolves in a vertical plane at right angles to the line of travel and is driven by two land wheels through interchangeable bevel gears to give gap widths of 8, 10, and 12 in. It was considered that the machine worked efficiently at each setting of gap width.—Silsoe, Beds.

2092. NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING.

Russell multiplanter [for cabbage, etc.].
Agric. Engng Rec., 1949, **2**: 220-1, illus.

A short report dated August, 1948. The machine comprises two identical units each consisting of a

knife coulter to clear away rubbish and loosen the soil, a furrow opener, two press wheels, and seats for two operators. Normally one operator is required to feed each unit. The machine handled an average of 5,250 plants an hour without, and 4,650 with, the Easy-feed attachment, compared with 2,100 with hand planting by five workers. Furthermore, the cabbages planted by machine established themselves more quickly and four weeks later were further advanced than the hand-planted cabbages. The machine was also used satisfactorily to plant leeks on the flat. It was considered that the machine effected a considerable saving in labour over hand planting.—Silsoe, Beds.

2093. ÅBERG, B., AND EKDAHL, I.
Effects of nitrogen fertilization on the ascorbic acid content of green plants.
Physiol. Plant., 1948, 1: 290-329 from *Soils Fert.*, 1949, Vol. 12, Abstr. 937.

Spinach, lettuce, radish, kale, tomato, wheat and parsley were grown in greenhouse beds or pots and supplied with various amounts of NH_4NO_3 . In the sub-optimum fertilization range where yields increased with increasing N supply there was a slight decrease in the ascorbic-acid content of the mature leaves, and an increase or constant level in young growing leaves. In the supra-optimum range where yields decreased with increasing N supply, ascorbic-acid and dry-matter contents rose with the higher rates of application of N. The initial decrease of ascorbic acid was not shown for wheat and parsley. Treatment of spinach with increasing amounts of NaCl resulted in lower ascorbic-acid contents.—Roy. Agric. Coll. Uppsala, Sweden.

2094. SMITH, J. B., AND SALOMON, M.
Optimum soil-nitrate levels for celery, carrots, spinach, onions and beets at different growth levels.
Bull. Rhode Island agric. Exp. Stat. 300, 1947, pp. 27 from *Soils Fert.*, 1949, Vol. 12, Abstr. 1056.

Except for onions, concentrations of less than 25 p.p.m. of nitrate N produced less than optimum yields and supplied less N than was removed by the crops. For celery, spinach and beets which give high response to N, there was a high degree of correlation between yields and N applications for the entire growth period. Celery needs only 25 p.p.m. of nitrate N during the first third of the growing period and 50 p.p.m. thereafter. Late spinach beet grows best with 50 p.p.m. or more throughout growth. Carrots need 10-25 p.p.m. during the first third of the growth period and 25-50 p.p.m. thereafter. Sweet Spanish onions require 10-25 p.p.m. throughout growth and high concentrations may be detrimental.

2095. SCHLEUSENER, P. E., PEIKERT, F. W., AND CAROLUS, R. L.
Results of irrigation of vegetable crops.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 31: 343-50.

The tests were carried out with portable pipe sprinklers on a sandy loam soil in 1948, a year of subnormal rainfall. *Wax beans*: 6 in. of water increased yields by 41% and 6 additional inches by another 14%. *Tomatoes*: The optimum amount was 4 in., which in

two varieties produced an increase in yield of 63% and 69% respectively. *Sweet corn* was benefited more by irrigation than either of the other crops. In the Erie and Golden Cross varieties the application of 4 in. of water increased the number of marketable ears by 257% and 628% respectively and the weight per ear by 56% and 44% respectively. In some of the crops yields decreased with larger quantities of water. The results warrant investment in irrigation equipment in Michigan.

2096. LOBOV, M. F.
Determining the water requirements of plants in irrigation. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1949, 66: 277-80, bibl. 6.

The author correlates the osmotic pressure of the cell sap of leaves of tomato and potato with the atmospheric and the soil moisture as a means of determining the water requirements of the plants.

2097. FLEMION, F., AND HENRICKSON, E. T.
Further studies on the occurrence of embryoless seeds and immature embryos in the Umbelliferae.
Contr. Boyce Thompson Inst., 1949, 15: 291-7, bibl. 11.

In a previous study (see *H.A.*, 17: 179) it was found that embryoless seeds with an apparently normal endosperm occurred frequently among members of the Umbelliferae, including carrot, celery, dill, parsley and parsnip. Species from Egypt, Norway and America are investigated in this further study at the Boyce Thompson Institute, in an attempt to determine the factors responsible for this condition. Seeds produced out of doors late in the season showed a tendency to contain a high percentage of embryoless seeds. Also the two seeds within a given pair frequently behaved similarly. Otherwise there was no correlation with various factors such as spacing of plants, crop yields, seed size, soil types, climatic conditions, position on the plant or genetical influence. Neither was any correlation observed between embryolessness and the incidence of immature embryos.

2098. FLEMION, F., POOLE, H., AND OLSON, J.
Relation of lygus bugs to embryoless seeds in dill.
Contr. Boyce Thompson Inst., 1949, 15: 299-310, bibl. 38, illus.

An investigation to determine whether insect damage was responsible for the high proportion of embryoless seeds from Umbelliferous crops revealed that this condition almost invariably occurred, and usually in very high percentages, on plants that had been caged with the tarnished plant bug (*Lygus oblineatus*). Nymphs as well as adults were destructive, and were able to destroy the embryo at almost any stage of development. The total seed crop may be reduced when feeding occurs at or near the flowering period. Except for a few cases, no embryoless seeds were produced in plants grown in insect-free cages, or in plants caged with other insects. Dill plants were used throughout this investigation, but preliminary experiments with carrot indicated that *Lygus* is also responsible for embryoless seeds in this species.

2099. FLEMION, F.

Lygus bugs in relation to the occurrence of embryoless seeds in the Umbelliferae.

Science, 1949, 109: 364-5, bibl. 10.

Evidence is presented which suggests that lygus bugs are responsible for the natural occurrence of embryoless seeds in carrot and dill.

2100. MILLER, W. A.

Molds on vegetables in Indianapolis retail markets.

Butler Univ. Bot. Studies, 1949, 9: 88-92, bibl. 4.

From 1 March to 15 May, 1948, 17 genera of fungi were identified from 57 specimens of vegetables collected in retail markets in North Indianapolis. The most common contaminants were *Macrosporium*, *Rhizopus*, *Aspergillus*, and *Periconia*. More than two genera were found on tomato, onion, green bean and turnip.

2101. LEACH, L. D.

Growth rates of host and pathogen as factors determining the severity of pre-emergence damping-off.

J. agric. Res., 1947, 75: 161-79, bibl. 21, illus.

Effect of temperature on growth and so on severity of pre-emergence damping-off in spinach, peas and water melons was noted. In all combinations of host and pathogen pre-emergence infection was most severe at temperatures which were relatively less favourable to the host than to the pathogen as measured by the ratio of their growth rates. In *Pythium*-infested soil seed decay and pre-emergence infection of garden peas was most severe between 12° and 25° C. Water melon, a high temperature crop, escaped infection by *Pythium* or *Rhizoctonia* at 35° C., but was more severely infected as the temperature was lowered.

2102. RIPPER, W. E., GREENSLADE, R. M., AND LICKERISH, L. A.

Combined chemical and biological control of insects by means of a systemic insecticide.

Nature, 1949, 163: 787-9, bibl. 5.

Preliminary trials are reported with *bis* (bisdimethyl-amino=phosphonous)-anhydride, the first insecticide that combines systemic with selective properties, thus allowing biological control to prevent reinfestation after treatment. Field experiments on brussels sprouts infested with cabbage aphid showed an initial kill of 72% with an application of 3 lb. of the compound per acre in 150 gal. water (0.2%). After 14 days a 70% reduction was still maintained. In another trial this degree of control was maintained for 7 weeks. A similar spray was successful against *Brevicoryne brassicae* on a cabbage seed crop, and good results in the field were obtained against aphid on hops, where dosages of 1½-3 lb. gave 100% control. In the latter case protection was afforded for a period of over 6 weeks. In general the insecticide was found to be specially effective against aphides and certain related Homoptera, while it is relatively non-toxic to beneficial insects. As a result of a study of its effect on plants, the use of the chemical is at present contemplated only on peas, brussels sprouts, sugar beet and hops. Its application does not involve any hazard for the

consumer, provided a period of at least two months elapses between the last treatment and harvesting.

2103. BENNETT, S. H.

Preliminary experiments with systemic insecticides.

Ann. appl. Biol., 1949, 36: 160-3.

Experiments are described which show the toxicity to infesting insects of plants in soil treated with systemic insecticides, e.g. Bis-fluoroethoxymethane and tetradimethylamidopyrophosphate applied to the soil at 200 p.p.m. will keep cauliflower plants free from infestation by mealy cabbage aphid for 3 to 4 weeks, but only bis-dimethylaminofluorophosphine oxide is toxic to larvae of *Pieris brassicae* (cabbage butterfly) 7 weeks after application to the soil.—Research Station, Long Ashton, Bristol.

2104. GRANGER, M. M., AND LEIBY, R. W.

How plants absorb parathion.

Agric. Chemls, 1949, 4: 2: 34-5, 79-85, bibl. 1.

In greenhouse tests parathion in a 15% wettable powder form was shown to be translocated to certain plants when incorporated in the soil before or at the time of planting. Two grams of the powder mixed in 500 g. soil killed 100% (a) black bean aphid on nasturtium for a period of 7 weeks; (b) third instar Mexican bean beetle larvae on beans from the second to the third weeks; (c) potato aphid [not specified] from the third to the eighth weeks on the older leaves, but only 10% or less on new growth; (d) melon aphid on melon, but only at 8 weeks after planting. Plants growing in treated soil were initially retarded but caught up with the controls after 8-11 weeks.—Cornell University.

2105. PRIMOST, E.

Schädigungen von gärtnerischen Kulturpflanzen bei Anwendung von DDT als Bodendesinfektionsmittel. (Injuries of horticultural plants by the use of DDT as a soil disinfectant.) [English summary.]

PflSch. Ber. Wien, 1949, 3: 42-7, bibl. 10.

The results show that with tomatoes, soya- and dwarf-beans, concentrations of 0.01, 0.02 and 0.05% technical DDT, when mixed with the soil, caused a reduction of the total root system. There was no development of any root hairs. The growth of the plants in treated soil was remarkably reduced and the blossoming retarded. [From author's summary.]—Hochschule f. Bodenkultur, Vienna.

2106. CHAPMAN, R. K., AND ALLEN, T. C.

Stimulation and suppression of some vegetable plants by DDT.

J. econ. Ent., 1948, 41: 616-23, bibl. 4, illus.

Observations and experiments made at the University of Wisconsin suggest that the action of DDT on plants is similar to that of some of the growth substances. Treatment of squash, cucumber, bean, pea, maize, carrot, potato and tomato plants with high concentrations of DDT resulted in stunting, deformity, necrosis and chlorosis. At reduced concentrations, specific for each type of plant, stimulation of growth and flowering occurred. DDT is absorbed through the leaves or the roots and translocated to the growing point.

2107. BIRD, R. D.

Flea beetles.

Processed Publ. Canad. Dep. Agric. Ser.
Ent. 83, 1948, pp. 3.

Flea beetles are widely distributed across Canada and few vegetable gardens are free of them. They attack particularly radish, horse-radish, turnip, cabbage, brussels sprouts and cauliflower, and to less degree sugar beet, garden beet, beans and other vegetables. Certain weeds, too, serve as sources for infestation. Their life history and the damage they cause are outlined. They can be controlled with DDT either as a spray or dust, prepared as follows: Spray—1 lb. 50% wettable DDT, 50 gal. water: about 100 gal. per acre. Dust—Proprietary ready-mixed dusts containing 2% or 3% DDT, applied at the rate of about 35 lb. per acre.

2108. ŠMALJKO, V. F.

The leaf mining fly on vegetables in the open ground and its control. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 57-8.

The life history and feeding habits of the leaf mining fly, which has been found damaging tomato, cucumber, pumpkin and cabbage plants in greenhouses around Moscow in recent years, are described. Control measures recommended are the application of 5% DDT in talc applied to the plants and the surrounding soil 2 or 3 days before the adult flies emerge or on the first day of their appearance.

2109. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

The green vegetable bug (*Nexara viridula*).

Agric. Gaz. N.S.W., 1949, 60: 96-7, illus.

In New South Wales the green vegetable bug is mainly a pest of beans and tomatoes, but it may also attack cauliflowers, melons, potatoes, pumpkins, spinach beet, squashes, grapes, oranges, and passion fruit, as well as various ornamental plants and weeds. The bug is described and its life history outlined. In coastal areas in most seasons, it is largely controlled by the introduced wasp parasite, *Microphonus basalis*, but in inland areas the parasite does not appear to survive, in any number, from season to season. Control may be obtained by spraying with 0.1% DDT emulsion—4 fluid oz. of a 2% DDT emulsion to 5 gal. of water. Pumpkins, melons or other related vine crops, should not be treated with DDT. Here pyrethrum powder mixed just before use with an equal quantity of 2½% nicotine dust, applied liberally with a dust gun, gives effective control.

2110. GAINES, J. C., AND DEAN, H. A.

Comparison of insecticides for control of harlequin bugs.

J. econ. Ent., 1948, 41: 808-9, bibl. 1.

Much damage to crops such as cabbage and turnip can be prevented by control of the overwintering adults of the harlequin bug (*Murgantia histrionica*). Results of laboratory and cage tests at College Station, Texas, indicate that chlorinated camphene, DDT, benzene hexachloride, and parathion are more effective against adult harlequin bugs than sabadilla or chlordan. The relative humidity appeared to affect the toxicity of DDT and chlorinated camphene.

2111. ARNASON, A. P.

Red turnip beetle.

Processed Publ. Canad. Dep. Agric. Ser.
Ent. 100, pp. 4.

For the control of the red turnip beetle, *Entomoscelis americana* Brown, rotenone may be used on all cruciferous vegetables with complete safety. DDT may be applied at any time on turnips, radishes, and weeds, but not on cabbage, cauliflower or broccoli after these have formed heads, because its residues may have some harmful effects on man. Cultural practices which reduce or prevent infestations are fall or early spring ploughing, keeping cruciferous weeds under control, planting cruciferous vegetables only on land that has been clean summer-fallowed the previous year or has been ploughed before hatching begins, and gathering and burning residues of cruciferous vegetables.

Garden vegetables.

(See also 1715-1719, 1721-1723, 1730, 1733, 1736-1738, 1740, 1745-1749, 1750j, 1908, 1912, 2548, 2550, 2601, 2611.)

2112. KELBERT, D. G. A.

New vegetable varieties for Florida.

Proc. Fla. St. hort. Soc. 60th annu. Meet.
1947, pp. 97-9 [received 1949].

A list of tomato, pepper, onion, lettuce, eggplant, cantaloupe, pole bean, cucumber, and sweet corn varieties suited to various parts of the State.

2113. BANGA, O.

Veredeling van de asperge in California.

(Breeding asparagus in California.)

Meded. Dir. Tuinb., 1949, 12: 264-70, bibl. 6.

An account of the asparagus breeding work at the experimental station of the University of California at Davis, California, based on information obtained during a study visit to that State in 1946.

2114. HARRINGTON, J. F.

Hard seed in beans and other legumes.

Seed World, 1949, 64: 1: 42-4.

A summary of the factors influencing the condition known as "hard seed" of legumes, a condition responsible for much of the non-germination of live seeds. The theory that there is a colloidal deposit in the seed coat that on drying becomes impermeable to water has been substantiated by observation. Experiments show that this hard seed condition can be increased or decreased by varying the moisture content of the seed. This explains why the hard seed percentage may vary in seeds of the same variety grown in different areas and in different years. Hard seededness, however, is also a genetical character, and it is possible by selection to breed strains that show no hard seeds until a very low moisture content is attained. Three methods of overcoming the problem are suggested: Scarification, to allow the entry of water; storage in suitable conditions (70° F. at a relative humidity of 50%); and breeding.—University of California, Davis.

2115. KLOSE, A. A., AND OTHERS.

Growth-depressing fractions in raw lima beans.

Arch. Biochem., 1949, 22: 215-23, bibl. 15.

"Lima beans and various fractions derived from them

were shown to be good sources of a growth inhibitor for rats."

2116. RANDHAWA, G. S., AND THOMPSON, H. C.
Effect of hormone sprays on yield of snap beans.
Proc. Amer. Soc. hort. Sci., 1948, 52: 448-52, bibl. 6.

In trials at Ithaca, N.Y., in 1947 and 1948 β -naphthoxyacetic acid, *p*-chlorophenoxyacetic acid, α -o-chlorophenoxypropionic acid and 2,4,5-trichlorophenoxyacetic acid were applied in the form of sprays in various concentrations to snap beans. Early yield of beans was increased in most cases by hormone treatments. Increase in total yield was obtained only by the application of *p*-chlorophenoxyacetic acid (2 p.p.m.) applied twice a week to fall crops. Spraying the plants with 2,4,5-trichlorophenoxyacetic acid in concentrations varying from 2 to 20 p.p.m. depressed the yield. Pods from treated plots appeared to be of somewhat superior quality in colour, uniformity and greater length. No significant difference was found in ascorbic acid content of the pods from various treatments. [From authors' summary.]

2117. DELLE COSTE, A. C., AND OTHERS.
Determinación de dos virus del haba en cultivos de los alrededores de la ciudad de Buenos Aires. (Identification of 2 broad bean viruses occurring in the Buenos Aires area.)
Rev. Invest. agric. B. Aires, 1948, 2: 81-8, bibl. 7, illus.

In the last few years virus diseases have appeared in crops of broad beans (*Vicia faba*) in the district round Buenos Aires. A study of the symptoms and host range and an analysis of the sap, made at the Estación de Cuarentena de Plantas de José C. Paz, showed that there were 2 viruses present, the broad bean mosaic caused by *Pisum virus 1*, and the broad bean streak caused by the sweet pea streak virus.

2118. TEŠIĆ, Ž. P. (TECHITCH, J. P.).
Bacterial diseases of beans. [Yugoslavian with 4-page summary in French.]
Belgrade, 1946, pp. 44, bibl. 33, illus. [received 1949].

Three bacterial diseases of beans are described, based on observations made on the experimental field at Zemum (Belgrade) and at the central pathological station at Versailles. The symptoms of the three diseases and their causal organisms are described under (1) bacterial spots (*Bacterium phaseoli*), (2) bacterial wilt (*B. flaccumfaciens*) and halo blight (*Bacterium medicaginis* v. *phaseolicola*).

2119. REID, W. D., AND BRIEN, R. M.
Control of anthracnose of dwarf beans.
N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 304-6.

Three and four applications of bordeaux mixture and of Cuprox (copper oxychloride) to dwarf beans infected with anthracnose (*Colletotrichum lindemuthianum*) reduced infection between 2.08% and 6.65%. Differences in effect between 2, 3 or 4 applications or between spray materials were not significant. Sprayed plots gave an average green pod yield of 44.7 oz. and control plots of 29.4 oz.

2120. CAMPBELL, L.
Gray mold of beans in Western Washington.
Plant Dis. Repr., 1949, 33: 91-3.

Gray mould (*Botrytis cinerea*) in Blue Lake beans was most destructive where the rows were closest together, where the stand of plants and the growth of foliage were greatest, where the rows ran at right angles to the direction of the prevailing winds, and where the air movement through the plantings was obstructed. Observations suggest that the Blue Lake bean is normally resistant to infection by *Botrytis* and is infected only after the fungus has made initial growth on living parts previously blemished. Dusting trials yielded unsatisfactory results.

2121. STOLL, K.
Über Sporenkeimprüfungen in geschlossenen Pflanzenbeständen. (A study of fungus spore germination under a continuous plant cover.)
NachrBl. dtsh. PflSchDienst, 1948, 2: 118-20, bibl. 5.

The germination, in the field, of pycnosporos of *Ascochyta* spp. on broad bean leaves was studied as a contribution to a major investigation into the role of bio-climatic factors in the spread of plant diseases.—Aschersleben Branch of the Biologische Zentralanstalt, Germany.

2122. COTTIER, W.
Resistance of dwarf beans to field infestation of bean weevil (*Bruchus obtectus*. Say.).
N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 284-6.

Of 10 varieties tested, the most resistant were Small White, Red Mexican, Refugee, and Perfect. Pencil Pod Wax, Canadian Wonder, Brown Beauty and Golden Wax were intermediate, while Bountiful and Wood's Centenary were least resistant.

2123. DE FLUITER, H. J.
Over de voedselplanten van de zwarte bonenluis, *Aphis (Doralis) fabae* Scop. (The food plants of the black bean aphid.) [English summary 1½ p.]
Tijdschr. PlZiekt., 1949, 55: 69-87, bibl. 25.

The rearing of *Aphis fabae* on a number of cultivated and wild plants is described. It was found that the first stage and fundatrix larvae developed normally if transferred to various winter and summer host plants, which include ornamentals and fruit and weed species.

2124. WESTER, R. E., AND WEIGEL, C. A.
Effect of DDT insecticides on plant growth and yield of some bush lima bean varieties.
Proc. Amer. Soc. hort. Sci., 1948, 52: 453-60, bibl. 7.

DDT in various forms and concentrations showed a tendency to stunt the growth of one, but not of the remainder, of 14 lima bean varieties to which it was applied in experiments at Beltsville, Md.

2125. SAYRE, C. B., AND VITUM, M. T.
Effect of sodium salts and rate of seeding on the yield of beets.
Agron. J., 1949, 41: 235-9, bibl. 4.

Where beets are purchased on a graded basis with a

premium for small-sized beets, the net returns can be increased by heavier rates of seeding provided the beets receive adequate fertilizers including sodium. Increasing the rates of seeding from 9.8 to 15.6 lb. per acre significantly increased the proportion of the more valuable smaller beet, but it was found that 500 lb. sodium chloride per acre, in addition to liberal applications of fertilizer, were necessary in the Western New York area, if the beet were to survive the competition of thick seeding. Sodium was found to improve the colour and flavour of beet leaves and make them stronger and more erect, and thus more suitable for machine harvesting. [From authors' summary.]—New York St. agric. Exp. Stat., Geneva.

2126. LEE, S. H.

The effects of bud pollination on fertility and F_1 fruit characters of some Chinese brassicas. *Proc. Amer. Soc. hort. Sci.*, 1948, 52: 435-40, bibl. 18.

At East Lansing in Wu Ta Tsai cabbage [*B. chinensis* var. *rosularis*] bud pollination greatly increased self fertility. It did not do so in Kao Yu Tsai mustard (*B. juncea* var. *gracilis*) or in Chi Kuan Tsai mustard (*B. juncea* var. *celerifolia*).

2127. NORTH, C.

Improving cabbage seed: some problems of production. *Fruitgrower*, 1949, 107: 809-10.

Practical recommendations on problems of isolation, time of sowing, overwintering and pest control, from the National Institute of Agricultural Botany.

2128. MICHAÏLOVA, L. N.

On variation in plant forms. [Russian.] *Doklady Akad. Nauk S.S.S.R.*, 1949, 64: 137-40, bibl. 16, illus.

Three hybrid cabbages were propagated vegetatively from lateral buds to preserve the clones, and grown under various environmental conditions. The three varieties were subject to open pollination and the variations in the progeny noted.

2129. VORONKEVIČ, I. V.

The overwintering of the cabbage soft rot bacterium (*B. aroideae*). [Russian.] *Doklady vsesojuz. Akad. sel'sk. Nauk S.S.S.R.*, 1949, No. 2, pp. 22-4, bibl. 2.

The cabbage soft rot organism (*Bacterium aroideae*) overwinters in the cabbage stalks left in the soil and in the leaves rotting on the ground. Control thus consists in burying such debris deeply.

2130. HOLZ, W.

Mehr Beachtung der Kohlfiege in den Anzuchtbeeten. (The importance of cabbage root fly control in brassica seedlings.) *Ceres, Hamburg*, 1949, 2: 4/5: 25-7.

Data of experiments are presented, which were carried out by the plant protection service Oldenburg, to demonstrate the necessity for controlling cabbage root fly by applications of E605-f, DDT, etc., to the seedlings, either in solution or as a dust.

2131. FRANKLIN, D.

Some problems in carrot seed production. *Seed World*, 1948, 63: 8: 8-9, 44-5, illus.

The results of plot experiments carried out at the Parma Experiment Station, Idaho, on practical problems of carrot seed production are presented to growers in this important centre of production. In an attempt to avoid winter storage, stecklings (roots of one season's growth) were planted out by various methods in autumn instead of in spring. All methods involved too great a risk of winter injury to allow commercial recommendation. A delay in planting out after roots have been removed from store may result in serious reduction in seed yield, due primarily to a decreased stand of plants. Contrary to popular belief, a spacing of 8-12 inches results in higher seed yield than wider spacing, regardless of the size of root used. Growers are recommended to aim at the production of medium-sized roots, as these produce as good a crop as large roots and require less room for storage and production.

2132. DARBY, F. M.

Mechanizing the carrot crop. *Agriculture*, 1949, 56: 61-3.

A description of a trial system, in use for one season, on the black fen soil of west Norfolk where yields of over 20 tons of carrots per acre are obtainable, but where the future of the crop depends largely on an early solution to weeding and harvesting problems. For weed control, in the rows, paraffin was used (commercial P.V.O.) at rates of 30-70 gal. per acre, depending on weed growth and weather. Sowing the crops in double rows 7 in. apart with 17 in. between double rows economizes in oil, as the inter-row can be hoed by tractor. At harvest the carrot tops were cut with a small power-driven grass mower, cutting one double row at a time. This was followed by a light 3-row baulk harrow which pulled the tops into line. A small tractor-mounted implement, with 2 L-shaped shares, delivered 2 double rows of roots into the intervening space from where a potato harvester, with elevator digger chain, delivered the crop, first, to a sorting platform and, finally, into trailers.

2133. ŠAMBUROVA, O. A.

Raising cauliflower seedlings in nutrient cases. [Russian.] *Sad i Ogorod* (Orchard and garden), 1949, No. 3, pp. 45-6.

An account is given of raising cauliflower seedlings in peat blocks which can be transferred direct to the soil where they readily disintegrate. They are made of peat, sawdust, and cow dung in the proportions 3:1:1/2, with mineral salts and water added to obtain the required consistency. A table shows the increase in root surface obtained by this method.

2134. DUNNE, T. C., AND JONES, L. T.

Molybdenum for the prevention of "Whiptail" in cauliflowers. *J. Agric. W. Aust.*, 1948, 25: 412-18.

Whiptail of cauliflowers, due to Mo deficiency, occurs in Western Australia on a variety of soil types, and has been observed regularly on both acid and alkaline soils. Growers are advised to apply sodium molybdate at the rate of 2 lb. per acre mixed with the usual fertilizer dressing, applied close to the plants at the time of planting or shortly afterwards.

2135. VENNING, F. D.

Stimulation by wind motion of collenchyma formation in celery petioles.

Bot. Gaz., 1949, 110: 511-14, bibl. 2, illus.

The collenchymatous bundle sheaths situated along the ribs of celery petioles are responsible for most of the stringiness of celery. The development of this tissue is stimulated by exposure to constant wind, with the result that the bundles are larger and contain cells with heavier thickening. The number of collenchyma bundles per petiole, however, is not affected.—University of Miami.

2136. DAVIS, J. F., AND LAWTON, K.

Correlation of soil test results with celery plant growth.

Proc. Amer. Soc. hort. Sci., 1948, 52: 443-7, bibl. 8.

Preliminary trials at East Lansing, Mich., to determine the relationship between celery plant growth and rate of fertilizer application.

2137. DELLA BEFFA, G.

La mosca del sedano. (The celery fly [*Acidia heraclei*].)

Ital. agric., 1949, 86: 296-301.

The biology of the celery fly in the province of Asti in Northern Italy, is examined and control measures are suggested. In this district as many as 5 generations may appear in a year. The addition of gammexane to copper sprays used against *Septoria apii* should suffice to control it.

2138. VAN DER HELM, G. W., KERS, D., AND VAN DEN MULZENBERG, E. W. B.

De witlofteelt in België. (Brussels chicory cultivation in Belgium.)

Meded. Dir. Tuinb., 1949, 12: 357-69, bibl. 2, illus.

An account of Brussels chicory growing in Belgium with tables showing the export (in tons) to neighbouring countries in 1947/48, and the acreage under this crop in 1937/38 and in the post-war years.

2139. GUTIEV, G.

The chayote. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 3, pp. 71-2, illus.

The chayote [*Sechium edule*] is described, and an account is given of its introduction and cultivation in Russia. It is perennial and produces a large, rather irregular pear-shaped fruit. It is stated that one plant yields up to 100 fruits in its first year and 250-300 in the second. Although it is generally considered as subtropical it can no doubt be grown successfully in the southern regions of the north temperate zone where moisture is adequate.

2140. MINISTRY OF AGRICULTURE.

Cucumber mosaic.

Adv. Leaf. Minist. Agric. Lond. 340, 1949, pp. 4, illus., 1d.

The symptoms of cucumber mosaic on various hosts, including not only cucumber but also other cucurbitaceous plants as well as tomato, spinach and a number of ornamentals, are described, and the aphid vectors mentioned. Control measures are outlined.

2141. ALPATJEV, A. V.

Eggplants in the central zone of Russia. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 4, pp. 59-64.

The eggplant is generally grown in the south of Russia but by selecting suitable varieties and by attention to cultural details good crops can be got farther north. Suitable varieties are mentioned and briefly described. Air and soil moisture must be high. Cultural operations are described in detail. The fruit should be picked when it is technically ripe (before the seeds become hardened), otherwise the development of the new fruit will be retarded and yield low. Crossed seedlings show heterosis; hybrids may give crops 40% to 60% greater than those of their parents, and they are more resistant to diseases and unfavourable conditions. Pests and diseases and their control are mentioned.

2142. ANON.

Lettuce trial results.

Fruitgrower, 1949, 107: 616.

Results of preliminary trials of lettuce varieties under glass carried out by the N.A.A.S. in collaboration with growers. For heated culture the Cheshunt varieties; Early Giant, 5B and Early Ball, gave best results for earliness, overall size, size and firmness of heart and leaf texture. Gloria and May Queen did best under unheated conditions.

2143. SCHROEDER, R. A.

Nutrient-element balance and growth of leaf lettuce.

Proc. Amer. Soc. hort. Sci., 1948, 52: 464-6, bibl. 2.

Greenhouse tests on Grand Rapids lettuce variety in midwinter at Columbia, Mo., emphasize the likelihood that the practice of heavily manuring lettuce and giving nitrate of soda without reference to other nutrient elements, particularly phosphorus, may result in reduced growth.

2144. VEIHMEYER, F. J., AND HOLLAND, A. H.

Irrigation and cultivation of lettuce.

Bull. Calif. agric. Exp. Stat. 711, 1949, pp. 52, bibl. 19.

The experiments, full data of which are presented, were carried out with the object of testing irrigation and cultivation practices current in the Monterey Bay region of California. The results clearly indicate (a) that 3 irrigations of summer- and autumn-maturing lettuce, supplying a total of 14 in. water, the first to germinate the seed, the second when thinning, and the last 30 days later, suffice, and (b) that after the crop is planted cultivation for purposes other than weed control is wasted effort.

2145. CHAMBERLAIN, E. E.

Occurrence of lettuce-mosaic in New Zealand.

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 296-9, bibl. 12, illus.

Lettuce-mosaic occurs in New Zealand in three widely separated localities, where its incidence may rise to 10%. It causes vein clearing, mottling and distortion of leaves, accompanied at times by necrotic spotting, dwarfing of plants and defective hearting. The virus is sap-transmissible and seed-carried. It appears to

be the same as that classified by Smith (1937) as *Lactuca virus 1*.

2146. PARRIS, G. K.
Watermelon breeding.

Econ. Bot., 1949, 3: 193-212, bibl. 60.

A summary of the fruit and plant characters that are desirable in a watermelon, and the inheritance of these characters, is followed by a detailed historical account of the breeding for resistance to fusarium wilt and anthracnose that has been carried out in America.

2147. THE PLANT DISEASE SURVEY, DIVISION OF
MYCOLOGY AND DISEASE SURVEY, U.S.
DEPARTMENT OF AGRICULTURE.

**Cantaloupe mosaic investigations in the
Imperial Valley.**

Plant Dis. Repr., Suppl. 180, Jan., 1949,
15 pp.

The results of these investigations are described in 7 reports, dealing with the following subjects:—The cantaloupe mosaic disease; vectors concerned in transmission of cantaloupe mosaic in the Imperial Valley; vectors of cantaloupe mosaic and their transmission habits; aphid flights in relation to cantaloupe mosaic; large-scale insecticide tests; breeding muskmelons for resistance to mosaic; and suggestions for future research.

2148. FERGUSON, W. G.

Onion growing in Queensland.

Qd agric. J., 1949, 68: 125-34, illus.

A practical article which briefly covers the subject from soils to marketing. The industry is almost entirely confined to the S.E. corner of the State. The type grown is the Spanish globe. Locally selected strains of Early Hunter River Brown Spanish are used for April sowings with Brown Spanish as the main crop in May-June. An early white selection of Hunter River is also planted. Owing to high labour costs no transplanting is done. Instead the seed is drilled in the field 1 in. deep in drills 12-15 in. apart at the rate of 1½ to 1¾ lb. per acre, equivalent to 24-28 seeds per yard. Too early sowing produces bulbs with seed stems, sowing too late gives insufficient time for bulbs to mature before the hot weather when the risk of bulb scald is high. Seed is usually "dry-planted" and then irrigated. The number of subsequent irrigations depends on type and condition of soil. Excessive irrigation produces "bull necks" and scallions, delays ripening, favours disease, and adversely affects keeping quality. Downy mildew causes trouble at times and should be treated with a copper spray, with spreader, applied at intervals of 10-14 days. The only serious insect pest is onion thrips, against which the most satisfactory treatment is 0.1% DDT emulsion spray applied at least fortnightly. Advice is given on plant selection and seed production.

2149. ROLL-HANSEN, J.

Matløk. (Onion growing in Norway.)

Reprinted from *Landbruksuka*, 1948, pp.
228-55, bibl. 22.

A great expansion of onion-growing in Norway is recommended. Practical notes on cultivation trials are followed by recommendation of increased cultivation by the small grower in Norway.

2150. FLÉROV, A. F., AND FLÉROV, V. A.

**The formation of flowers on leaves of the
garden onion. [Russian.]**

Priroda (Nature), 1949, No. 2, pp. 62-3,
illus.

The author found that when the inflorescence of an onion plant was removed and the leaves cut across, the cut ends of the leaves each developed a bract and an inflorescence. Reference is made to other workers who obtained similar results with begonia and achimenes.

2151. PETERSON, C. E., AND HABER, E. S.

Iowa Yellow Globe 44.

Seed World, 1949, 64: 4: 14-16.

A new long-keeping variety of onion, bred by the Iowa Agricultural Experiment Station, is introduced. It was selected and tested on muck soils, and in these conditions has shown good colour and storage quality and an unusual uniformity in date of maturity.

2152. EYSTER, H. C.

Inhibitor in onion for starch synthesis.

Science, 1949, 109: 382-3, bibl. 2.

Members of the lily, iris, amaryllis, and gentian families do not store starch in the leaves following photosynthesis, apparently because of the presence of a starch synthesis inhibitor. The onion is shown to have such an inhibitor.

2153. HOYLE, B. J.

**Onion curing—a comparison of storage losses
from artificial, field, and non-cured onions.**

Proc. Amer. Soc. hort. Sci., 1948, 52:
407-14, bibl. 6.

In trials at Davis, Calif., artificial curing of onion bulbs by forcing warm air at 105° to 118° F. through open mesh bags containing the onions proved highly satisfactory and saved much time. The curing generally took about 16 hours. The treatment is described.

2154. CHAMBERLAIN, E. E.

Onion yellow-dwarf: successful eradication.

N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp.
300-1, bibl. 3.

Onion yellow-dwarf, observed in New Zealand first at Marshland, near Christchurch, and Blenheim, and more recently at Nelson and Hastings, has been found also on shallots. By enforcement of control regulations the disease has been eradicated from the onion-growing district of Marshland.

2155. GERASIMOV, B. A.

**Treatment of onion seed and cabbage
seedlings. [Russian.]**

Sad i Ogorod (Orchard and garden), 1949,
No. 3, pp. 56-7.

Effective control of onion fly [*Delia antiqua* Meig.] by DDT, and cabbage fly [*Delia brassicae* Bronché] by DDT and "GHCG" (hexachlorane) is reported. Data are tabulated for an experiment with cabbage seedlings dusted on stems and roots with 5% DDT or 7% GHCG at the time of transplanting.

2156. DUSTAN, A. G.

Onion maggot.

Processed Publ. Canad. Dep. Agric. Ser. Ent.
89, 1948, pp. 3.

The onion maggot, *Hylemya antiqua* Meig., its life

history and damage caused are outlined. The most generally satisfactory method of control is to apply calomel to the seed before sowing. When onions are being grown from sets or transplants 4% calomel dust should be applied to the soil; the dust should touch the young plants and extend for 2 inches on each side of the row.

2157. ARMAND, J. E.

Onion thrips.

Processed Publ. *Canad. Dep. Agric. Ser. Ent.*

106, 1948, pp. 3.

The onion thrips (*Thrips tabaci* Lind.) and its life history are described. For its control 5% chlordane or DDT dust at the rate of 20 to 25 lb. per acre may be used. Effective sprays are 2 lb. of 20% wettable chlordane or DDT powder in 40 gal. of water.

2158. WILCOX, J., AND HOWLAND, A. F.

DDT dust for control of onion thrips.

J. econ. Ent., 1948, 41: 694-700, bibl. 4.

A report of a 3-year experiment made in Southern California to determine the best timing and number of applications of 10% DDT dust on onions for the control of *Thrips tabaci*. It is considered that treatments beginning when the onions are only 10 inches high and covering a 6-week period, either as 3 applications at 2-week intervals or 6 applications at weekly intervals, are the most effective. The applications appeared to have remarkably little residual effect.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2159. PARKER, M. W., AND OTHERS.

Spectral sensitivities for leaf and stem growth of etiolated pea seedlings and their similarity to action spectra for photoperiodism.

Amer. J. Bot., 1949, 36: 194-204, bibl. 10.

By determining the wavelength of light most effective for leaf and stem growth, and comparing it with that needed for floral initiation in photoperiodically-sensitive plants, the author has tried to establish a relationship between the two processes. The red portion of the spectrum between 6100A and 7100A was found to be most effective for leaf elongation of etiolated seedlings of *Pisum sativum*, but a definite effect was produced by irradiation throughout the visible. Effectiveness decreased rapidly with increase in wavelength beyond 7200A. Some evidence was obtained of inhibition of stem elongation by radiation. The action spectrum closely resembles that for control of floral initiation in photoperiodically-sensitive plants. [See *H.A.*, 16: 351 and 19: 748.] This indicates that the two processes are controlled by the same basic mechanism, which is probably also effective in the control of other growth phenomena. [From authors' summary.]—California Institute of Technology, Pasadena.

2160. MULDER, E. G.

Investigations on the nitrogen nutrition of pea plants.

Plant & Soil, 1948, 1: 179-212 from *Soils Fert.*, 1949, Vol. 12, Abstr. 1061.

In field experiments with peas there was no response to combined N on soils where growth was good. On soils where growth had been poor in previous years there was a clear response to supplied N. Plants growing in the absence of combined N were more

heavily attacked by *Fusarium* sp. than those well supplied with N. In experiments on the response of pea plants to B no symptoms of B deficiency were found in the tops of plants, but N fixation was decreased and plants ripened at an earlier date and gave lower yields.—Agric. Exp. Stat., Groningen.

2161. BAUR, K., AND TREMBLAY, F. T.

Commercial fertilizers for canning and freezing peas in Western Washington.

Bull. Wash. agric. Exp. Stat. 503, 1948, pp. 19, bibl. 23.

The studies indicate that applications of 60 lb. per acre of P_2O_5 and 60 lb. of K_2O properly placed in bands [at the time of seeding] sufficed for peas under most western Washington soil conditions. [From authors' summary.]

2162. MCWHORTER, F. P.

Susceptibility of selections of Perfection peas to strains of yellow bean mosaic.

Plant Dis. Repr., 1949, 33: 139-44.

Perfection peas are generally immune to yellow bean mosaic but, from the results here recorded, it is concluded that Early Perfection selections are not uniformly resistant to strains of the virus. To the author it seems that the problem will require local investigation by geneticists and plant pathologists to determine the selections of Early Perfection most likely to prove resistant to the various strains of bean virus 2 present in the area where the peas are to be grown.

2163. KERLING, L. C. P.

Aantasting van erwten door *Mycosphaerella pinodes* (Berk. et Blox.) Stone. (*Mycosphaerella pinodes* attacking peas.) [English summary 1½ p.]

Tijdsch. PlZiekt., 1949, 55: 41-68, bibl. 56, illus.

An account of the effect of the fungus on the pea plant and of its life cycle under Dutch conditions. Hygiene is important for control. Seed disinfection may help against spores or mycelium on the seed coat, but the fungus may also be present in cotyledons of peas which show no outward sign of injury. Plants with healthy pods should be selected for seed.—Lab. voor Mycologie en Aardappelonderzoek, Wageningen.

2164. UFER, M.

Die Möglichkeit der Züchtung *Bruchus*-resistenter Erbsen. (On the prospects of breeding *Bruchus*-resistant peas.)

Bodenkultur, 1948, 2: 28-35, bibl. 7.

TSCHERMAK-SEYSENEGG, E.

Ist es möglich, Erbsensorten zu züchten, die vom Erbsenkäfer weniger befallen werden? (Is it possible to breed pea varieties that are less liable to attack by the pea weevil?)

Ibid., 1949, 3: 200-4, bibl. 17.

The second paper refutes the optimism expressed in the first.

2165. HEISER, C. B., JR., AND SMITH, P. G.

Observations on another species of cultivated pepper, *Capsicum pubescens* R. & P.

Proc. Amer. Soc. hort. Sci., 1948, 52: 331-5, bibl. 14.

The differences observed between *Capsicum pubescens* and *Capsicum frutescens* are set out in detail.

2166. BARBIERI, R.
La concimazione minerale in orticoltura.
(Three-year trial of artificial fertilizers for
peppers in Campania.) [English summary
5 ll.]
Ann. Sper. agrar., 1949, 3: 199-228, bibl. 10.
- All varieties under trial were found capable of utilizing to good advantage large quantities of fertilizer material. Quality would not appear to be affected by the amounts given. From an economic point of view it was found that about 7 quintals per hectare of sulphate of ammonia was the optimum amount of nitrogenous fertilizer, whereas at present much more is given.—Staz. chimico-agrar., Portici.
2167. SZIRMAI, J.
Virusbetegségek terjedése a vetőmag útján.
(Seed transmission of virus diseases.)
[English summary 1½ pp.]
Bull. Fac. Hort. Budapest, 1948, 12: 164-81,
bibl. 21.
- Of the vegetables studied, pepper was investigated most extensively. Pepper seeds infected by a virus complex, the chief component of which is cucumber mosaic, showed a marked reduction in germination energy and power. The presence of the virus could be detected in the pollen, in the secretion of the stigma, in the pericarp and in the placenta of the fruits. In 5 years' experiments the so-called watery extraction method has been worked out to detect external infection of seed. In virus-infested seeds infection was found to decrease from the seed coat to the endosperm and the embryo. Disinfection of the seed was achieved by 10 minutes' treatment with 1% NaOH. Symptoms of virus infection in the seedling stage appeared in the cotyledons and in the first leaves, their expression being favoured or masked by low and high temperature respectively. Seed transmission of mosaic was also proved for bean, soybean and cucumber, with symptoms becoming manifest in the seedling stage. The data are tabulated with English subtitles.
2168. MARTIN, J. A.
Bacterial spot resistance in peppers.
Proc. Amer. Soc. hort. Sci., 1948, 52:
336-40, bibl. 6.
- A description is given of 4 lines of pepper found to be resistant to bacterial spot (*Xanthomonas vesicatoria*).
2169. SNYDER, W. C., AND BARDIN, R.
Occurrence of fusarium wilt in a market-
garden crop of radishes.
Plant Dis. Rept., 1949, 33: 9.
- Many of the radishes affected with this disease (caused by *Fusarium oxysporum* f. *raphani*) reach marketable size but the leaves turn yellow and wilt; the roots, when cut, show dark brown vascular discoloration. Some plants died in the rows.
2170. JOHN INNES HORTICULTURAL INSTITUTION
(DARLINGTON, C. D., Editor).
Sweet corn in England.
John Innes Leaflet, 8, pp. 13, or *Collected
John Innes Leaflets*, 2nd edition, 1949,
pp. 70-82, illus.
- Varieties of sweet corn most suitable for growth in England are those which have arisen from flint corns in the New England States and Ontario. Their cultivation on a variety of soils is not difficult, though weeding is necessary. Birds, mice, smut, and fruit-fly are dangers. The notes on cultivation, on choice of varieties, on picking and packing and hints on the production of hybrid seed given here should materially help growers.
2171. HASKELL, G.
Presoaking and cold hardiness in maize.
Plant & Soil, 1949, 1: 342-5, bibl. 5.
- Seed of four inbred sweet corns and one dent hybrid corn were pre-soaked in tap water prior to receiving 60° F. treatment. Pre-soaking did not alter their behaviour to cold treatment although, on transference to the warmth, germination was slightly more rapid after pre-soaking. [Author's summary.]—John Innes Hort. Inst., Merton, London.
2172. KELSHEIMER, E. G.
The use of some organic insecticides in the
control of earworms attacking sweet corn.
Proc. Fla. St. hort. Soc. 60th annu. Meet.
1947, pp. 121-3 [received 1949].
- A discussion on some of the newer organic insecticides. It is concluded that DDT 3% dust and methoxy DDT 3% dust are good controls for the corn earworm. DDT is not effective against the fall armyworm, whereas methoxy DDT is. Since methoxy DDT is so effective as a budworm control when applied as a dust to leaf whorls, it should be considered as a control measure for the corn earworm and fall armyworm which attack sweet corn. Sprays were less effective than dusts of the same material. Since these must be direct applications to the silk of the ears, airplane dusting is generally ineffective. Drifting of dust has proved of little value commercially. Crop remains dusted with DDT are considered unsafe to feed to livestock. [From author's conclusions.]
2173. PLOPER, J.
Una variedad interesante de tomate: la
"Pearl Harbour". (Pearl Harbour, an
interesting tomato variety.)
Circ. Est. exp. agric. Tucumán 142, 1949,
pp. 4, bibl. 2.
- The tomato variety Pearl Harbour, produced by the agric. Exp. Stat. Tucumán, Argentina, in 1947, and tested for two seasons at Honolulu, is recommended for commercial trial by growers in Tucumán. Its outstanding advantage is the low cost of production. Being a dwarf bush variety it needs no disbudding, and little staking or training. The yield per plant is comparatively low, but such close spacing is possible that the yield per acre may be higher than average. The fruit is small, but earlier than any of the other 10 commercial varieties tested. The variety is not resistant to virus.
2174. ANON.
New tomato resists important diseases.
Seed World, 1949, 64: 4: 45.
- In trials in the Southern States of America and elsewhere the new tomato variety Southland has shown resistance to collar rot and fusarium wilt. It also showed some resistance to early blight and to one form of late blight. Yields were good.

2175. SOMOS, A.
Paradicsomfajták fejlődési és termesztési összehasonlító vizsgálata. (Comparative tomato trials [in Hungary].) [English summary 2½ pp.]
Bull. Fac. Hort. Budapest, 1948, 12: 3-45, bibl. 10.

With the exception of Turul, Hungarian tomato varieties proved inferior to foreign. The breeder's aim must be to produce tomatoes suited to the climate of the country.

2176. LEWIS, D. C.
Problems of rogue tomatoes.
Fruitgrower, 1949, 107: 358.

Temperature during the early stages of germination is the most important factor in determining the percentage of rogues produced by tomato seeds. For best results the seed should be grown at 56° F. until the first true leaf appears. When temperature is controlled, a consistent percentage of rogues is obtained; it would therefore be possible for seedsmen to give an indication of seed quality by stating the percentage of rogues at a specified temperature. The position of the flower truss and type of plant selected for seed saving are other important factors. Seed saved from the first and second truss of plants with long internodes generally produce few rogues.—John Innes Horticultural Institution.

2177. MACGILLIVRAY, J. H.
Color specification of the Federal Canning Tomato Grade as related to horticultural color determination.
Proc. Amer. Soc. hort. Sci., 1948, 52: 415-29, bibl. 51.

Colour determinations of tomatoes indicated a satisfactory interpretation of the colour terms of United States Standards for Canning Tomatoes. There were isolated cases where the accuracy was undesirable, but it is thought that the objective colour measurements would increase accuracy of grading. Such measurements would be helpful in using the same standards over a series of years. [Author's summary.]

2178. WITNER, C. L.
B-vitamin changes during development of cucurbit and tomato leaves.
Amer. J. Bot., 1949, 36: 355-9, bibl. 10.

This study was undertaken in order to obtain data on the fluctuations of biologically important compounds that might help to determine the factors controlling growth and development. The changes in concentration of 10 B-vitamins in the leaves of tomato and *Cucurbita pepo* are correlated with different growth stages. Results showed that the increase or decrease of vitamin depends on the vitamin and variety in question. Usually thiamin, pantothenic acid, inositol, choline, biotin and niacin occur in greatest amounts in the tip regions. Pyridoxine and riboflavin are often more concentrated in the mature leaves. Folic acid and *p*-aminobenzoic acid show no particular distribution. The nitrogen and dry weight data have no particular correlation with the vitamins.—Brooklyn College, N.Y.

2179. VAN KOOT, Y., AND BRONS, E. C.
Winning en ontsmetting van tomatenzaad. (Extracting and disinfecting tomato seed.) [English summary 7 ll.]
Meded. Dir. Tuinb., 1949, 12: 197-206, bibl. 14.

The chemical disinfection of tomato seed is impracticable, for only few tomato diseases are transmitted by the seed, and the seed itself is very susceptible to injury by mercury-containing preparations. The effect of heat was examined and it was found that the adhering spores of *Verticillium dahliae* (the cause of wilt) and of *Didymella lycopersici* (stem and fruit rot) can be killed by submerging the seed in water at 45-50° C. for half an hour, without injury to the seed.

2180. PROCTER, C. H.
Extraction of tomato seed with hydrochloric acid.
N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 301-4, bibl. 1.

Results tabulated show that seed extracted by acid had a brighter colour, a consistently higher germination and maintained its germination better during storage, than that extracted by fermentation. Best results were obtained when 25 ml. of acid were added to the pulp from 5 lb. of fruit, and seed washed after two hours. Germination was lowered when seed was dried at 99° F., but was unimpaired at 88° F.

2181. DHILLON, A. S., AND LUCAS, E. H.
Transmission through graft unions of formative stimuli induced by 2,4-dichlorophenoxyacetic acid.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 31: 354-7, bibl. 6.

The formative stimulus which resulted from the application of sodium 2,4-dichlorophenoxyacetate to tomato leaves was transmitted through graft unions from the stock to the scion several weeks after the plant used as stock was treated. The stimulus appears to be a directly transmitted substance, but its chemical nature is not further specified. [Authors' summary.]

2182. AIZENČTAT, JA., S.
The effect of a previous mentor on the development of recessive characters in hybrid tomatoes. [Russian.]
Doklady Acad. Nauk S.S.S.R., 1949, 64: 711-14.

Details are given of a field experiment in which tomato plants were subjected to the effect of previous grafting before crossing. It was found that the method served as an effective means of regulating dominance in tomatoes. The effect was seen, not only in the phenotype plants F_1 , but also in the genotypes.

2183. TAI, E. A.
Cultural practices.
Ext. Circ. Jamaica Dep. Agric. 20, 1948, pp. 10.

A publication intended mainly to assist growers of export tomatoes. Advice is given on choice of variety and on cultural operations from sowing to harvesting. The requirements of the various fresh fruit markets are specified. Marglobe and Bonny Best are favoured in the U.S.A. and Canada; Ailsa Craig and Potentate suit the U.K. For canning, Marglobe and Oxheart are suitable.

2184. SKRIPNIČENKO, L. A.
Regulating the growth and development of tomatoes. [Russian.]
Sad i Ogorod (Orchard and garden), 1949,
 No. 4, pp. 41-7.

Experimental data are tabulated to show the effect of date of planting out tomato seedlings and the closeness of planting in the open. The advantage of early planting is stressed, but the grower is advised to choose the time most suitable for his particular region, bearing in mind liability to frost damage. Hardening off the young plants in the frames is important.

2185. MIALLET, A.
Essai de fumure rationnelle sur la tomate.
(A trial of a rational manuring for tomatoes.)
Progr. agric. vitic., 1949, 131: 157-9.

An account of a manurial trial with tomatoes. All the plants received a basic manure and then a more or less balanced fertilizer mixture containing sulphate of ammonia, bone superphosphate and chloride of potassium. Some then received more sulphate of ammonia and others more superphosphate. The added ammonium sulphate induced precocity with an adverse effect on yield, while the added superphosphate increased the yield.

2186. LAMBETH, V. N.
Nutrient-element balance and time of anthesis in tomato flowers.
Proc. Amer. Soc. hort. Sci., 1948, 52:
 347-9, bibl. 2.

In pot trials of Master Marglobe tomato in a prepared substrate it was found that fertilizer treatments favouring the greatest total growth were also those conducive to early flowering. A high N/P ratio resulted in delayed and a high P/N ratio in early flowering.

2187. ALBAN, E. K., FORD, H. W., AND HOWLETT, F. S.
A preliminary report on the effect of various cultural practices with greenhouse tomatoes on the respiration rate of the harvested fruit.
Proc. Amer. Soc. hort. Sci., 1948, 52:
 385-90, bibl. 2.

In trials at Wooster, Ohio, with the variety Globe strain A there was a tendency for the fruits harvested from plants grown at 67° F. night temperature to have a higher rate of respiration than the fruits from plants grown at either 57° or 62° F. night temperature. There was no significant difference in the rate of respiration of treated tomato fruits (growth regulating chemicals) as compared with the untreated fruits. Neither the method of treatment nor the kind or combination of chemicals materially affected the respiration rate of the harvested fruit. The respiration rate of the harvested fruit of greenhouse tomatoes grown under three soil levels of potassium revealed a positive correlation between high potassium level and high rate of respiration. [From authors' summary.]

2188. WENT, F. W., AND HULL, H. M.
The effect of temperature upon translocation of carbohydrates in the tomato plant.
Plant Physiol., 1949, 24: 505-26, bibl. 21,
 illus.

The rate of bleeding of decapitated tomato plants

depends on the activity of the root system, and this in turn is affected by its sugar content. By immersing 2 leaves in a sucrose solution, and varying the temperature along the stem between these leaves and the root, the effect of temperature on the rate and intensity of sugar translocation was measured in terms of rate of bleeding. "It was found that the time necessary for the sugar to take effect decreased as the temperature of the intermediate stem piece was decreased. The amount of sugar translocated gradually increased as the temperature was lowered. This means that in the tomato plant both the rate and intensity of sugar transport have a Q10 well below 1."—Calif. Inst. of Technology, Pasadena.

2189. KEMP, H. K.
Artificial fruit setting in tomatoes.
J. Dep. Agric. S. Aust., 1948, 51: 327-35,
 illus.

The results of pilot and commercial scale trials of the use of growth substance to set glasshouse tomatoes. Single treatment with a water solution containing 100 p.p.m. β -naphthoxyacetic acid resulted in a gross return of £20 and £21 more from two standard 60 ft. \times 15 ft. houses than from untreated plants. Among 9 other growth substances tried, 2,4-dichlorophenoxyacetic acid gave good results in weight of fruit but undesirable growth. Tests were not exhaustive on other substances which also promised well. There was no material difference in the food values of the heated and unheated tomatoes. β -naphthoxyacetic acid is recommended, and the method of application and cultural care are discussed.

2190. FERRI, M. G., AND AYLTHON, B. J.
Partenocarpia inducida con ácido β -naftoxiacético. (Parthenocarp by β -naphthoxyacetic acid.)
Bol. Fac. Filos. Cienc. e Letras, S. Paulo, Brazil, 94, 1948, pp. 27, abstr. in *Rev. Fac. Agron. B. Aires*, 1948, 12: 155.

This bulletin gives a revised bibliography of induced parthenocarp, and directions on the use of β -naphthoxyacetic acid. An analysis is made of results of a trial in which this growth substance was used on tomatoes. 75% of the fruit from treated plants was seedless. Those that had seeds were in general larger and heavier than the control fruits. Treated plants, moreover, bore fruit earlier.

2191. SCOTT, L. E., AND HAWES, J. E.
Storage of vine-ripened tomatoes.
Proc. Amer. Soc. hort. Sci., 1948, 52:
 393-8, bibl. 11.

The relationship between coloration and temperature in tomatoes picked green and those picked after red colour has developed was found in trials at College Park, Md, to be generally the same, although it would seem that the complete inhibition of red coloration reported as being effected by temperatures above 30° C. does not hold for fruits harvested after colour initiation. The physiological collapse or breakdown described as occurring when green mature tomatoes are held at low temperatures before ripening was not found to occur in the present tests with vine-ripened fruit. The results obtained indicate the advisability of handling vine-ripened tomatoes under conditions of refrigeration

(from 32° to 45° F.) in order to prevent loss from over-ripening and to maintain quality.

2192. HANSEN, C. M., AND FARRALL, A. W.
Protection of tomatoes from frost damage by use of radiant energy.
Quart. Bull. Mich. agric. Exp. Stat., 1949, 31: 332-42.

During this series of tests [at Michigan State College Farm], tomatoes under field conditions were successfully protected against damage from a radiation-type frost when the temperature at 1 in. above the ground was 26° F. outside the protected area. Tests also showed that a radiation intensity of 2.65 watts per square foot was necessary to give adequate protection at 26° F., the intensity being measured at right angles to the direction of radiation. Fuel consumption of the radiant-type, infra-red, frost-prevention unit was 10.8 gallons of kerosene per hour. Kerosene fuel, for these units, must meet a certain standard of volatility. Temperature measurements must be made in the field to be protected, when determining the time to start the radiation units. All thermometers must be exposed to the atmosphere. Weather Bureau or other readings, taken at a distance, do not give a true indication of the temperature condition in a given field. [Authors' summary.]

2193. MARTYN, E. B.
Tomato diseases and their control.
Ext. Circ. Jamaica Dep. Agric. 21, 1948, pp. 7.

Notes on the control of damping off, leaf mould, early blight, late blight, wilt (*Fusarium* sp.), mosaic, root-knot (eelworm), blossom end rot, and fruit rots.

2194. SMITH, K. M.
Virus diseases of the tomato.
Agriculture, 1949, 56: 119-22, illus.

This article is confined to those viruses which are, or may become, of economic importance. There are 5 viruses commonly associated with the tomato plant, of which only 2, as far as is known, are insect-borne. In descending order of economic importance, these are the viruses of tobacco mosaic and its strains, tomato spotted wilt, cucumber mosaic, tomato black ring, and tomato bushy stunt. The symptoms of these diseases and the methods of spread of the viruses are described first; next, two common potato viruses sometimes found infecting tomato plants are dealt with briefly, and finally the methods of control are treated collectively.

2195. ELLIS, D. E., AND GARRISS, H. R.
Control tomato late blight.
Ext. Circ. N.C. Coll. Agric. 331, 1947, pp. 8, illus.

Measures of control recommended include the following: Start with disease-free plants, and spray or dust them once each week with a fixed copper compound such as tribasic copper sulphate, Copper-A Compound, or Cupricide, the first application to be as soon as the plants are growing well after transplanting. Dust treatments should be repeated after each rain that is heavy enough to wash off the dust. All parts of the plant above ground should be covered thoroughly.

2196. PIMENOVA, A. S.
Antiseptic watering to control tomato streak. [Russian.]
Sad i Ogorod (Orchard and garden), 1949, No. 4, pp. 71-2.

Figures are presented to show that the incidence of tomato streak can be reduced by applying an antiseptic to the young plants and at intervals later. The substances used in the trials were a bactericide ("Zbarski bactericide", composition not stated) at 1:10,000, potassium permanganate 0.05%, and copper sulphate 0.1%. Marked reduction of streak was shown with the bactericide, some reduction with potassium permanganate, but even more infection with copper sulphate.

Mushrooms.

2197. EDWARDS, R. L.
Mushroom Research Station at Yaxley
[England].
Nature, 1949, 163: 337.

A short account of the setting up of this station in 1945 with the development of a commercially satisfactory synthetic compost as its main problem. Brief notes follow on research in progress.

2198. EDWARDS, R. L.
M.R.A. report on 'synthetic composts.'
Bull. Mushroom Gr. Ass. Peterborough 15, 1949, pp. 84-8.

Provisional directions for the making of synthetic mushroom compost from wheat straw and artificial fertilizers are given as a result of investigations by the Mushroom Research Station at Yaxley. Baled straw is thoroughly wetted and stacked until fermentation has set in. It is then composted with a balanced mixture of nutrients and activators, consisting of dried blood, superphosphate, gypsum, sulphate of potash, carbonate of lime, and certain trace elements. No water is added after composting has started. The heap is turned weekly, a mixture of superphosphate and gypsum being added at the final turning; the compost should be ready for filling 4 to 5 weeks from stacking. The proportions of nitrogen, phosphate and potassium required in straw composts to give the best yield of mushrooms, the best form of nitrogen to use, and the desirability of adding soil and trace elements are problems that have been carefully investigated at Yaxley, and the findings are summarized here. The importance of further research on mushroom composts, however, is emphasized.

2199. BURROWS, S.
An aerobic medium for fungus growth studies.
Nature, 1949, 164: 30, bibl. 3.

The preparation of an aerobic medium is described which lends itself to the study of growth substance and trace element requirements of the cultivated mushroom. The medium is based on milled transparent cellulose shavings dyed black for the observation of mycelial growth.

2200. ATKINS, F. C., EDWARDS, R. L., AND SPARKES, E. D.
New insecticides. A report for the mushroom grower.
(Publ.) *Mushroom Gr. Ass. Peterborough*, 12 pp., bibl. 19, 2s. 6d.

An account is given of some of the newer insecticides and of methods of applying them in relation to the control of mushroom pests, with a list of firms who supply these preparations.

Potatoes.

(See also 2545, 2546, 2579, 2600.)

2201. CORRELL, D. S.
Collecting wild potatoes in Mexico.
Circ. U.S. Dep. Agric. 797, 1948, pp. 40, illus.
The material collected in the highlands of south-central Mexico is to be used in breeding.

2202. HOWARD, H. W.
Crops and plant breeding.
J. roy. agric. Soc., 1948, 109: 1-12, bibl. 68.
Four of the ten pages of text of this review are devoted to potatoes.

2203. EKLUND, S.
Eine biochemische Methode zur Sorten-Bestimmung bei Kartoffeln (*Solanum tuberosum*). Vorläufige Mitteilung. (A biochemical method of identifying potato varieties. Preliminary communication.)
Züchter, 1948, 19: 118-19, bibl. 16.

It seemed desirable to find a biochemical substitute for the protracted method of identifying potato varieties by means of morphological description and cultural trials. It is shown that each variety contains the different amino acids in a characteristic ratio and that this ratio can be determined by electrometric titration. Graphs indicate a specific reaction irrespective of environmental conditions during growth and storage.—Svalöf, Sweden.

2204. STEVENSON, F. J.
Foreign potato introductions.
Amer. Potato J., 1948, 25: 259-65.
The subject is dealt with from the breeder's point of view. Recommendations are made for the organization of an institute whose sole objective would be "the introduction of potato material, its maintenance, and certain studies relating to its possible usefulness".

2205. AKELEY, R. V., STEVENSON, F. J., AND SCHULTZ, E. S.
Kennebec: a new potato variety resistant to late blight, mild mosaic, and net necrosis.
Amer. Potato J., 1948, 25: 351-61.

The variety combines high yield and good cooking quality with a high degree of disease resistance. Its keeping qualities in storage are described as excellent.

2206. JEHLE, R. A., AND STEVENSON, F. J.
The Marygold potato.
Amer. Potato J., 1949, 26: 25-32, bibl. 5.
Marygold is an early variety that outyields Irish Cobbler. Moreover, it produces larger crops of late potatoes after dormancy breaking than any other variety on the Eastern shore of Maryland similarly treated. A full description, yield data and a pedigree are presented.

2207. STEVENSON, F. J., AND LIVERMORE, J. R.
The Saranac potato: a new variety promising in Australia.
Amer. Potato J., 1949, 26: 45-6, bibl. 4.

A description is given of the new American variety Saranac, a selection of a cross of President × Katahdin, which has given excellent results in Australian tests. It is resistant to ring rot, fairly resistant to late blight, but very susceptible to leaf roll. For this reason the variety has not been distributed in the U.S.A.

2208. MONOT, G.
Essais de variétés. (Potato variety trials.)
Pomme de Terre franç., 1949, 12: 114: 15-20.

Yield data are presented from potato trials with 26 varieties grown in French Departments in 1947 and 1948. The results show that in the class of early and semi-early potatoes there is so far no variety likely to replace Bintje, which was used as the control.

2209. SALZMANN, R.
Bericht über die Hauptversuche mit neuen Kartoffelsorten des Jahres 1947. (Report on the chief trials of new potato varieties [in Switzerland] in the summer of 1947. Series 28, 29 and 30.)
Reprinted from *12th Rep. Vereinig. Schweiz. Versuchs- u. Vermittl. Stell. f. Saatkart.*, 1948, pp. 33.

The trials were carried out at the agricultural research station of Zurich-Oerlikon, the seed testing stations at Lausanne and elsewhere.

2210. GARVIE, T. B.
Seed potato growing.
Scot. Agric., 1949, 28: 175-9.

Observations by a grower on his methods of cultivation, harvesting and storage. Labour shortage would be overcome by extending the lifting season to 2½-3 months. More attention should be paid to careful handling, the lack of which causes greater damage than some virus diseases, and suggestions for improvement are made.

2211. CHOUARD, P.
Quatorze années de recherches expérimentales sur la végétation de la pomme de terre en montagne (Pyrénées centrales). Conséquences à en tirer. (Fourteen years of experimental research on potato growing in the central Pyrenees. Results obtained.)
C. R. Acad. Agric. Fr., 1949, 25: 122-8, bibl. 8, and *Pomme de Terre franç.*, 1949, 12: 116: 15-22, bibl. 8.

Observations are recorded on the yield of potatoes at different elevations in the Pyrenees, and on the incidence of disease. Optimum yields were obtained at heights of from 1,200 to 1,600 metres. Good crops can be obtained at 2,000 m., and even above 2,200 m. potatoes can be grown but then the results are of experimental interest only and not economic. The meteorological factors of the regions at high altitudes and the microclimates which differ according to the aspect and the relief of the ground, are discussed. The data indicate that high altitude does not only protect the plant from virus infection but also imparts increased vigour to the seed. Above 1,200 m. (and particularly above 1,600 m.) the Colorado beetle is unable to thrive, only isolated temporary colonies being seen. The incidence of blight corresponded in general with that on the plain, namely, according to rainfall, except that on the mountains, where insolation was more intense, the

foliage tended to dry more quickly after rains and severe infection did not occur. Virus diseases, when introduced, progressed relatively slowly because of the fewer aphids. Growing potatoes in the mountains did not eradicate virus diseases but did protect the plants against severe contamination.

2212. ROBAINA, I. C.
Observaciones sobre el cultivo de la papa.
(Potato growing [in Cuba].)
Publ. Misc. Est. exp. agron. Santiago de las Vegas 1, 1948, pp. 20, illus.

Written for the benefit of the grower. Many of the recommendations are based on observation of crops grown in the red soils of the western part of the island. This publication does not deal with diseases.

2213. RATERA, E. L.
Ensayos realizados con semillas de papa
(*Solanum tuberosum* L.). (Experiments with
potato seed.) [English summary.]
Rev. Fac. Agron. B. Aires, 1948, 12: 37-46,
bibl. 3, illus.

In an attempt to select healthy, vigorous and high-yielding strains of potato, seed trials were made by the Institute of Genetics of the College of Agriculture and Veterinary Science, Buenos Aires. Seeds produced by free pollination of the cultivated varieties Alma, Centifolia, Katahdin and Majestic were used. With the exception of a few plants of Alma and Majestic that produced a second generation, the material degenerated rapidly, and gave poor results. This is attributed to adverse environmental conditions and virus disease.

2214. RIEDL, W. A.
The inheritance of tuber-set in *Solanum tuberosum* L.
Bull. Wyo. agric. Exp. Stat. 287, 1948, 1
pp. 33, bibl. 43, illus.

Though tuber-set of potatoes (number of tubers per hill) is affected to a great extent by environmental conditions, little is known of the inheritance of this character. Studies reported here, however, indicate that tuber-set is an inherited character, and that much relevant information can be obtained from plants grown from the small tubers of first-year seedlings. It also appeared that crossing of unrelated parents had a marked tendency to restore yielding ability, so that it was possible to obtain low-tuber-set varieties with high yielding ability, when low-tuber-set varieties were crossed with each other. Such varieties would be suitable for arid conditions.

2215. EMILSSON, B.
Studies on the rest period and dormant
period in the potato tuber.
Acta Agric. suec., 1949, 3: 189-284, bibl.
pp. 7.

I. The rest period of the potato tuber. Comparative determinations of the length of the rest period have been made over a period of 3 years in 51 varieties. The rest period showed a remarkable intravarietal constancy indicating that its length is a varietal characteristic. The values found ranged between 5.0 weeks and 19.5 weeks. No definite correlation between

earliness and length of rest period could be demonstrated. A gradual decrease in the length of the rest period with increasing maturity at harvest was observed. The rest period was shorter in large than in small tubers. No significant difference was found between healthy tubers and tubers infected with virus Y or leaf-roll. Infection with *Phytophthora infestans* caused a very considerable shortening of the rest period. Storage at 0°C as well as at 20° shortens the rest period as compared with storage at 5°. High humidity (100%) appears to cause a significant shortening of the rest period in comparison with low humidity (60%). II. The dormant period of the potato tuber. The dormant period of the potato tuber is defined as that period during which the tuber may be stored at some temperature below the optimum for sprouting without beginning to sprout or to break down physiologically. Its length at 5° has been determined for 50 varieties during 2 years and ranges from 18 to 33 weeks, with 20 to 23 weeks being usual. III. The biochemistry of the rest period. In most cases analyses were performed on samples stored both at 5° and 20°. There was a rapid fall in respiration intensity during the first few weeks after harvest down to a plateau-value which remained fairly constant; pH was almost constant during storage at 5° but rose by 0.2-0.3 units at 20°. There was a rapid loss of ascorbic acid as well as of total vitamin C at both storage temperatures. The percentage of dehydroascorbic acid increased with increasing time of storage. The content of glutathione showed a consistent increase up to the end of the rest period when a maximum was reached. The maximal value was 2.5 times larger than the initial one. A very large decrease in the content of catalase was observed during the first 3 or 4 weeks after harvest. The content of phosphatase showed a slight increase during storage at 5° and a slight to moderate decrease at 20°. The content of total nitrogen did not change much. IV. The primary cause of the rest period. This is discussed from the biochemical, physiological and hormonal aspects. In the biochemical approach to the problem it is concluded that with the exception of glutathione none of the studied changes has any direct importance for the cessation of the rest stage. The probable significance of glutathione in the regulation of the rest period is discussed at length. [From author's summary.]—Inst. of Plant Research and Cold Storage, Nynäshamn, Sweden.

2216. MEDVEDEV, P. F.
Altering the nature of potato varieties by
changing the method of cultivation.
[Russian.]
Sad i Ogorod (Orchard and garden), 1949,
No. 3, pp. 59-61.

An account is given of raising two crops of potatoes per year in the southern steppe region of Russia. The seed tubers are planted in March and the crop harvested towards the end of June while the tubers are still physiologically immature. After gathering, the tubers are placed in a hot bed, under conditions of high temperature and moisture, to induce sprouting; they are then planted out in the second half of July and the second crop is harvested after the first autumn frosts. Some varieties react to this method of breaking dormancy more successfully than others.

2217. KOPETZ, L. M., AND STEINECK, O.
Untersuchungen über die Bestimmung des Pflanzgutwertes von Kartoffeln. Vorläufige Mitteilung. (The evaluation of seed potatoes. Preliminary communication.)
Bodenkultur, 1949, 3: 107-8.

Sprouting is not quite satisfactory as the sole criterion of seed potato quality, since results vary with the state of dormancy. As in the case of seeds, root development should be taken into account as well. Preliminary tests showed that the method evolved for seed testing is applicable to isolated buds of potatoes, which are planted in moist sand in small glass dishes. [See *ibid.*, 1948, 2: 161-83; *H.A.*, 19: 784.]

2218. NATTRASS, R. M.
The cutting and treatment of seed potatoes [in Kenya].
E. Afr. agric. J., 1949, 14: 219-22, bibl. 11, illus.

A reprint of an earlier article (*ibid.*, 1945, 11: 83-5) with an amendment and an addendum. The general principles of the subject, as they concern East African growers, are discussed.

2219. HOCHAPFEL, H.
Folgerungen aus den beiden Extremjahren 1947 und 1948 für den Saatkartoffelanbau in den Westzonen Deutschlands. (Conclusions to be drawn from the two extreme years 1947 and 1948 for the growing of seed potatoes in the western zones of Germany.)
Ceres, Hamburg, 1949, 2: 4/5: 27-31.

Meteorological data are discussed in connexion with peach aphid flights of the spring and early summer generations and the incidence of virus disease in seed potatoes. It is shown that in healthy fields aphid counts do not give an indication of the degree of infection to be expected. The control of the vector on peach and potato is practicable with E 605.

2220. ZABALA, S., AND TRAVERSI, B.
Obtencion en serie de plantas de papa, a partir de un solo tuberculo, en invernaculo. (Obtaining a series of potato plants from a single tuber, under glass.) [French summary.]
(Publ.) *Minist. Agric. Nacion, B. Aires*, 1948, Vol. IV, Ser. B, No. 13, pp. 14, illus.

By inducing the buds of a potato tuber to develop in succession, and propagating them separately, a continuous series of plants may be obtained from the same source. For this purpose the tuber is placed in a pot so that only one bud is in contact with the soil. This may be very useful in the study of virus diseases, where the aerial parts of a plant are required continuously for a long period.—Instituto de Sanidad Vegetal, Buenos Aires.

2221. SMITH, O., ELLISON, J. H., AND MCGOLD-RICK, F.
Growth of potato sprouts retarded by 2,4,5-trichlorophenoxyacetic acid.
Science, 1949, 109: 66-8, bibl. 2, being *Paper Dep. Veg. Crops, Cornell Univ.* 301.

The authors, working at Cornell University, report that spray applications to growing potatoes of sodium

2,4,5-trichlorophenoxyacetate and sodium naphthalene acetate retarded subsequent sprout growth of the tubers in storage. Sodium 2,4,5-T retarded sprout growth to a greater degree than sodium naphthalene acetate, although the latter was applied in 10 times stronger concentrations than the former. The successful use of the isopropyl ester of 2,4,5-T, in dust form, for retarding sprouts during storage experiments is also reported. A toothpick technique is described, used for obtaining information on the penetration of 2,4,5-T into tubers and its subsequent reaction on sprout growth.

2222. GREWE, F.
Über die Wirkungsweise von Belvitan K unter besonderer Berücksichtigung seiner fungistatischen Wirksamkeit. (The action of Belvitan K, with special reference to its fungistatic properties.)
Höfchen Briefe, 1949, 2: 1: 37-48, bibl. 12.

With its control of sprouting, which is not irreversible, Belvitan K combines a fungistatic action on *Phytophthora infestans* and *Fusarium* in stored potatoes.

2223. GANDARILLAS, H., AND NYLUND, R. E.
Further studies on the influence of sprout-inhibiting and sprout-inducing treatments on the growth and yields of potatoes.
Amer. Potato J., 1949, 26: 7-16, bibl. 1, being *Pap. sci. J. Ser. Minn. agric. Exp. Stat.* 2394.

The sprout-inhibiting and sprout-inducing treatments applied to Cobbler seed potatoes were methyl ester of naphthaleneacetic acid (MNA), at the rate of 20 mg. per kg. of tubers, and 40% ethylene chlorhydrin (EC), at the rate of 1.3 mg. per cubic decimeter of container volume, respectively. The chief results obtained are indicated in the following extract from the authors' summary: (1) MNA was most effective in delaying sprouting and retarding sprout growth when applied to stored tubers as late as possible in the storage period, but before tubers had come out of their rest period. (2) Limited determination of respiration rates indicated that the rate of respiration of MNA-treated tubers was considerably lower than that of untreated tubers. (3) MNA-treatment of seed tubers delayed emergence of plants in the field from 11 to 16 days. Treatment of MNA-treated tubers with EC, 6 days before planting, reduced this delay in emergence to only 3 days. (4) MNA treatment of seed tubers reduced the number of stems produced per plant by approximately 50%. Treatment of MNA-treated tubers with EC, 6 days before planting, resulted in plants having 28% fewer stems than had untreated plants. (5) Yields were found to be associated with both earliness of emergence and stem number. EC treatment did not completely counteract the inhibiting effects of MNA treatment on the rate of sprout growth and sprout number.

2224. ISBELL, C. L.
Effect of sprout preventive treatments on fall-harvested kohlrabi, potatoes, sweet-potatoes and turnips while in storage.
Proc. Amer. Soc. hort. Sci., 1948, 52: 368-74.

The two proprietary dusts used, containing respectively

methyl ester of naphthaleneacetic acid 2.2% and methyl 1-naphthaleneacetate 2.2% gave much the same results. They had little effect on kohlrabi and turnips. Treated potatoes stored under straw in the open or in barns sprouted and shrivelled much more slowly than untreated potatoes. There were indications that the substance had a delayed effect on sweet potato tubers.

2225. RAKITIN, JU. V., AND TROJAN, A. V.
Retarding the sprouting of potato tubers by chemical preparations. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1949, 66: 483-6, bibl. 4.

From the experiments described the author concludes that the application of the methyl ester of α -naphthaleneacetic acid (100 mg./k.) or of phenylurethane (250 mg./k.) for inhibiting sprouting in potatoes for storage is a practical operation. It costs little, prolongs the time during which potatoes may be stored, reduces losses, and preserves the nutritional and technical qualities of the tubers. Data are tabulated showing the composition of tubers for carbohydrates, vitamin C and amine nitrogen at the beginning and at the end of the experiment.

2226. WHITTENBERGER, R. T., AND NUTTING, G. C.
Effect of phytohormones on potato growth and the size of the starch granules.
Plant Physiol., 1949, 24: 278-84, bibl. 18.

According to European potato starch standards, increased granule size improves the commercial quality of the starch. It has been reported that treatment of seed tubers with indoleacetic acid will result in increased granule size in the new tubers. The investigations reported here, however, from the Agricultural Research Administration, Philadelphia, showed no effect on granule size from treatment with either indoleacetic acid or indolebutyric acid. Auxin treatment delayed sprouting and decreased the yield of tubers. It was observed that small and young tubers contained predominantly small starch granules, and that the growth of tubers was accompanied by an increase in average granule size.

2227. PRINCE, F. S., AND BLOOD, P. T.
The effects of 2,4-D on potato tops and tubers when sprayed at the full bloom stage.
Agron. J., 1949, 41: 219-20, bibl. 5.

A 10% decrease in yield was recorded for each $\frac{1}{2}$ pint 40% 2,4-D acid applied to potato crops during flowering, but the set of fruits was higher than on unsprayed plots. It is suggested that this fact might be of use to the plant breeder. Small quantities of 2,4-D were also found to increase the mealiness of the tubers.—New Hampshire agric. Exp. Stat., Durham.

2228. RUBIN, B. A., AND SOKOLOVA, V. E.
The role of ferments in the adaptation reactions of plants to their environment. [Russian.]
Doklady Akad. Nauk S.S.S.R., 1949, 64: 377-80, bibl. 6.

The author discusses the role played by ferments in the adaptation of plants to their environment, and shows the effect of varying temperatures during the

growing season on the synthesis of starch in the leaves and tubers of potato.

2229. HOUGHLAND, G. V. C., AND PARKER, M. M.
A study of three factors in potato production: row spacing, seed spacing, and fertilizer rate.

Amer. Potato J., 1948, 25: 393-406, bibl. 5.
"The largest financial returns [in Virginia] 'beyond' estimated cost of seed and fertilizer were realized from seed spaced 15 or 18 inches in rows 36 inches apart and from the 2,000-lb. application of fertilizer."

2230. VAN SLUICKEN, A.
Onderzoek naar de invloed van de minimumwet bij de bemesting van aardappelen. (Investigation of the effect of the law of minimum in the manuring of potatoes.)
Meded. Landb-Hoogesch. Opzoekingssta. Gent 13, 1948, pp. 79-112 from *Soils Fert.*, 1949, Vol. 12, Abstr. 640.

In a 2-year experiment with 2 varieties of potato on a clay loam, treatments comprised no fertilizer, NPKCa, PKCa, NPCa, NPK and NPKCaMg. The lime was applied to the preceding grassland, and the other fertilizers just before planting. Yields from the various treatments decreased in the order: NPKCaMg, NPKCa, NPK, NKCa and PKCa, nil and NPCa. The no-K treatment caused early maturing and abnormally dark green leaves, decreased the proportion of large to small tubers and increased the dry-matter content. Treatments including Ca and Mg gave insignificant increases in yield.

2231. Terman, G. L., AND OTHERS.
Nitrogen rate experiments.
Amer. Fert., 1948, 109: 7: 26 from *Soils Fert.*, 1949, Vol. 12, Abstr. 192.

Potato yields following clover were the same after applications of N fertilizer at 90, 120 and 150 lb./acre. Following potatoes for 2 or 3 years, yields were significantly greater from applications of 120 and 150 lb. than from 90 lb.

2232. ANON.
Application directe d'ammoniac comme engrais. (The application of ammonia by injection.)
Pomme de Terre franç., 1949, 12: 118: 8-9.

A brief description is given of an experimental apparatus designed for the application of liquid ammonia to the soil. The container feeding 6 fertilizer lances had a capacity of 227 litres, which is equivalent to 110 kg. of nitrogen. It was mounted on a tractor. Applications were made at the rate of 102 kg. nitrogen per hectare. Crops and results are not stated.

2233. HAWKINS, A., Terman, G. L., AND JUNKINS, J. C.
Phosphorus placement tests.
Amer. Fert., 1948, 109: 7: 11, 26 from *Soils Fert.*, 1949, Vol. 12, Abstr. 195.

In placement tests with potatoes, about $\frac{1}{4}$ inch of soil was placed on top of the band of P fertilizer before the seed was planted, or on the planted seed before fertilizer was applied, because freshly cut seed is injured by direct contact with superphosphate. In soils with low to medium readily soluble P, yields of potatoes were lower

when 80 lb./acre of P_2O_5 were applied with the seed than when applied in side bands. On a soil high in P the two methods produced the same yield.

2234. TERMAN, G. L., HAWKINS, A., AND JUNKINS, S. C.

Maine potato fertilizer tests. Potash source experiments.

Amer. Fert., 1948, 109: 7: 11 from *Soils Fert.*, 1949, Vol. 12, Abstr. 194.

K_2SO_4 produced a higher content of starch than did KCl . Plants fertilized with KCl had a higher Cl content and lower content of N, Mg and dry matter. There is an inverse relationship between Cl content in the plant and starch content in the tubers.

2235. MAGNICKI, K. P.

The effect of magnesium fertilizer on potato. [Russian.]

Sad i Ogorod (Orchard and garden), 1949, No. 4, pp. 74-6.

The symptoms of magnesium deficiency in potatoes are described. Data tabulated show considerable increase in yield from adding magnesium, as dolomite or as magnesium sulphate, to NPK fertilizer.

2236. TERMAN, G. L., AND HAWKINS, A.

Response of potatoes to zinc.

Amer. Fert., 1948, 109: 7: 26 from *Soils Fert.*, 1949, Vol. 12, Abstr. 193.

The results of fertilizer experiments indicate that Zn may be more deficient in some soils cropped every year or frequently to potatoes than where rotation is practised and adequate amounts of organic matter are returned to the soil. Yield responses to Zn may explain some increased yields obtained with dithane and other fungicides containing $ZnSO_4$.

2237. TERMAN, G. L., LIBBY, W. C., AND JUNKINS, S. C.

Applying mulch for potatoes.

Amer. Fert., 1948, 109: 7: 28 from *Soils Fert.*, 1949, Vol. 12, Abstr. 638.

Light mulching of land after potatoes are planted maintains soil-organic matter so that potatoes can be grown every year on the better land. The mulch crop should be grown on the poorer land where need for cultivation may be eliminated by chemical weed control. Partly-rotted straw, unchopped green grass and clover mulches applied after potatoes had been ridged once, all increased yield considerably; sawdust decreased yield. Extra N broadcast with the mulch at 60 lb./acre further increased yield of potatoes mulched with grass but not those mulched with clover.

2238. LEMMERMAN, O., AND GRÜTZ, W.

Zur Frage der Strohdüngung. (Manuring with straw.)

Z. Pfl. Ernähr. Düng., 1949, 44: 1-6.

The application of partly rotted straw plus N produced potato yields almost as high as did stable manure plus NPK. Data are presented.—Berlin University.

2239. CROSS, P. E., CROWTHER, E. M., AND SAMUEL, G. G.

The potato crop. I. Husbandry and cultural factors. II. Manuring of potatoes. III. The control of potato diseases.

J. roy. agric. Soc., 1948, 109: 98-127, bibl. 12.

The three reviews were written by the three authors respectively, the two first articles having a bibliography of 6 each.

2240. STATENS FORSØGSVIRKSOMHED FOR PLANTEKULTUR.

Foreløbig Meddelelse om kunstig Vandning af Markafgrøder. (The irrigation of field crops; a preliminary communication.)

Tidsskr. Planteavl, 1949 (?), 52: 551-4, being *Meddel. Statens Forsøgsvirks. Planteakult.* 409.

In potatoes, which are included in the field crops discussed, irrigation increased yields by 63% and 59% in 1946 and 1947 respectively.—Jyndeved research station, Denmark.

2241. MÜNSTER, J.

La récolte hâtive des semences de pommes de terre. (Early harvesting of seed potatoes.)

Rev. romande Agric. Vitic., 1949, 5: 17-20, bibl. 1.

Seed potatoes of two varieties were harvested at intervals from the middle of July to the beginning of October in five localities at altitudes ranging from 440 to 1,200 m. above sea level. Data on yield and percentage of virus infection are presented. Taking all factors into consideration, including thickness of skin, best results were obtained by pulling up the haulms singly at an early date and leaving the tubers in the soil for another 3-4 weeks. Chemical haulm destruction does not give complete protection against aphid infestation, since in many varieties new foliage develops after treatment.—Station fédérale d'essais et de contrôle de semences, Mont-Calme, Lausanne.

2242. H., J. C., AND O., R. J.

Separation of haulm in potato harvesting. *Agric. Engng Rec.*, 1949, 2: 195-9, illus.

With both diggers and harvesters the disposal or separation of haulm and weeds is probably best dealt with in the machine. In order to do this the share and soil-separating mechanism must be capable of dealing with plant material without risk of blockages or loss of efficiency. The disc share and reciprocating grid are two components that can be designed to do this, and additions to the second of two reciprocating grids in the form of three-pronged separating bars, illustrated, provide a satisfactory means of separation of haulm and weeds in potato harvesting. [From authors' conclusions.]

2243. MOMMELE, G.

Rapport sur la déficience de rendement dans la reproduction des plants arrachés—ou brûlés très tôt avant maturité. (On the decrease in yield of seed potatoes resulting from premature harvesting or premature haulm destruction.)

Pomme de Terre franç., 1949, 12: 114: 4-7.

The data presented for 1945 to 1948 show that there is a more or less fixed date—about 14 July in the Paris region—before which seed potatoes cannot be lifted or their haulms burnt without seriously affecting their reproductive capacity. Tubers of the C or higher classes harvested up to 25 and often 30 July were found to retain maximum sprouting capacity in spite of a slight increase in virus infection.

2244. BINKLEY, A. M., KUNKEL, R., AND EDMUNDSON, W. S.

The effect of chemical vine killers on yield and quality of Red McClure and Bliss Triumph potatoes.

Amer. Potato J., 1948, 25: 371-6, bibl. 2.

The trials carried out at the Colorado Potato Station and at the San Luis Valley Branch Station in 1946 and 1947 led partly to contradictory and inconclusive results. From one set of tests, however, it is evident that premature vine killing reduces specific gravity.

2245. EMILSSON, B., AND GUSTAFSSON, N.

Undersökningar beträffande bekämpning av bladmögel och brunrota hos potatis. IV. Fortsatta försök med blastdödade medel. (Studies on the control of late blight in potatoes. IV. Further trials with haulm-killing chemicals.*) [English summary ½ p.] *J. roy. Swed. Acad. Agric.*, 1949, 88: 188-200, bibl. 1.

It was found possible to add Ewos 936 to the list of chemicals that killed potato haulms effectively, if not rapidly, in small-scale trials. In tests on a field scale, however, the operation was successful in 6 out of 10 cases only (chemicals used: TAC 46 and Ewos), the failures being probably due to faulty spraying technique. If these conditions control of tuber blight was not uniform, but haulm-killing was clearly shown to be a practical means of achieving it. Though gross yields were reduced as the result of the treatment, net yields increased with the higher percentage of healthy tubers of saleable size.—Inst. for Plant Research and Cool Storage, Nynäshamn.

2246. C., G. R.

Mobile crane for bulk handling potatoes. *Agric. Engng Rec.*, 1949, 2: 205, illus.

A short description of a crane, for attaching to a wheeled tractor, for use in the beam and net method of handling potatoes in bulk.

2247. GARBOWSKI, L., AND TYCHANICZ, M.

Wystąpienie kompleksu wirusowego XY na odmianie ziemniaków Apolia i inne choroby wirusowe ziemniaków w Polsce. (Appearance of the virus-complex XY on the potato-variety Apolia and other virus diseases of the potato in Poland.) [English summary 8 ll.] *Przegląd Doświadczalnictwa rolniczego Poznań*, 1947, 3: 49-56, illus.

Using the vector *Myzus persicae* and inoculating differential host plants the authors proved the presence of the virus complex XY in Poland.

2248. SILBERSCHMIDT, K.

Observações sobre o teor de vírus de batatinhas Colombianas. (Observations on the virus content of Colombian potatoes.) [English summary 1 p.] *Arg. Inst. biol. S. Paulo*, 1947-48, 18: 289-312, bibl. 17, illus.

Samples of wild and cultivated potatoes brought from Colombia were tested for their virus content at the

Biological Institute, S. Paulo, Brazil. Many varieties, especially of the wild forms collected from high altitudes, were found to contain a virus belonging to the potato virus Y group. The symptoms produced by this virus when inoculated into *Nicotiana tabacum* and *N. glutinosa*, both alone and in conjunction with potato virus X, are described. The growth habit of some of the wild forms is also noted.

2249. RAMSEY, G. B., WIAIT, J. S., AND SMITH, M. A.

Market diseases of fruits and vegetables: potatoes.

Misc. Publ. U.S. Dep. Agric. 98, revised 1949, pp. 60, bibl. 212, illus.

This bulletin described 45 diseases and disorders of potatoes and their control. It is illustrated by 24 plates, 6 of them coloured.

2250. POST, R. L., AND OTHERS.

Results of spraying and dusting potatoes in North Dakota for 1946 and 1947.

Amer. Potato J., 1948, 25: 334-9, bibl. 1.

The combination of DDD 3% and HE 761 2% dusts gave a highly significant yield increase over the controls. Yields and pest incidence were not correlated.

2251. THURSTON, H. W., JR., LEACH, J. G., AND WILSON, J. D.

Chromates as potato fungicides.

Amer. Potato J., 1948, 25: 406-9, bibl. 1, being *Sci. Pap. West Va. Exp. Stat.* 394.

Two years' field tests at three experiment stations showed copper zinc chromate to be a promising inorganic fungicide for blight control.

2252. KNORR, L. C.

Suscept range of the potato ring rot bacterium.

Amer. Potato J., 1948, 25: 361-71, bibl. 8.

Twenty-five new susceptibles of the potato ring rot organism, *Corynebacterium sepedonicum*, are given. An additional 45 species are listed as showing no reaction to the disease. The differences in susceptibility between *Solanum demissum* and *S. demissum atypicum* are emphasized.

2253. LANE, G. H., KUNKEL, R., AND KREUTZER, W. A.

Tests of cutting knife disinfectants and cutting techniques in the control of ring rot of potatoes.

Amer. Potato J., 1948, 25: 446-54, bibl. 8, being *Pap. sci. J. Ser. Colo agric. Exp. Stat.* 278.

Tests of the disinfection of the double-edged stationary knife with 0.2% mercuric chloride indicated that the addition of a wetting agent to this disinfectant probably results in more effective ring-rot control on this knife. Disinfectant tests on the rotary blade showed satisfactory ring-rot control through the use of 5,000 p.p.m. of chlorine, 5,000 p.p.m. of chlorine plus Triton X300, 0.2% mercuric chloride, 0.2% mercuric chloride plus Triton X300, or boiling water. Prompt immersion of seed pieces in disinfectant solution (0.2% mercuric chloride or 2,000 p.p.m. of chlorine) after inoculation with contaminated cutting knife materially reduced the number of ring-rot plants, although ring rot resulting

* For preliminary haulm-killing trials see *ibid.*, 1948, 87: 199-215; *H.A.*, 18: 2788.

from both treatments was far in excess of that from uncut tuber lots. [From authors' summary.]

2254. STARR, G. H., AND RIEDL, W. A.
A comparison of *Corynebacterium sepedonicum* inocula from resistant and susceptible potato varieties.

Amer. Potato J., 1948, 25: 432-7.

The results of these experiments show that ring-rot bacteria infecting the Teton variety and ring-rot-resistant seedlings were not more pathogenic than those carried by susceptible varieties, such as the Bliss Triumph. [From authors' summary.]—Wyoming agric. Exp. Stat.

2255. RAEDER, J. M.

Ring rot of potatoes.

Amer. Potato J., 1949, 26: 126-31, bibl. 2, being *Res. Pap. Idaho agric. exp. Stat.* 287.

The data illustrate the importance of using completely clean seed, since seed containing only 1% ring-rot infection may involve more than 50% of the crop. On the other hand, losses in yield were found not to be strictly proportional to the percentage of hills affected, a stand of potatoes involved 100% being still capable of producing 25% of the normal crop. The picker type planter was shown to favour the dissemination of ring rot bacteria, while the assisted-feed type did not spread the pathogen.

2256. KOROTKOVA, P. I.

The sources and dissemination of black-leg of the potato. [Russian.]

Doklady vsesojuz. Akad. sel'sk. Nauk S.S.S.R., 1949, No. 3, pp. 39-43, bibl. 3.

The chief source of black-leg in potatoes, caused by *Erwinia phytophthora* [= *Bacterium phytophthorum*], is infected seed tubers. Infested soil has little effect on the course of the disease. After sowing, the organism is disseminated on implements and possibly by underground insects. Tables show the increase in infection as a result of cutting the seed tubers.

2257. LANSADE, M.

Essais de traitement du mildiou de la pomme de terre. (The control of potato blight.)

Pomme de Terre franç., 1949, 12: 115: 19-21, bibl. 5.

In 1948, 0.5% copper spray, especially bordeaux mixture, proved superior to other fungicides and to lower concentrations. A 15-20% copper dust is considered to be equivalent.—Station Centrale de Pathologie Végétale, Versailles.

2258. THE PLANT DISEASE SURVEY DIVISION OF MYCOLOGY AND DISEASE SURVEY, U.S. DEPARTMENT OF AGRICULTURE.

The warning service in 1948. Tobacco blue mold; potato and tomato late blight; cucurbit downy mildew.

Plant Dis. Repr., Suppl. 178, December, 1948, pp. 171-291.

This is a summary of the first year's work under the Crop Plant Disease Forecasting Project. The diseases included in the project are late blight of potato and tomato (*Phytophthora infestans*), blue mould of tobacco (*Peronospora tabacina*), and downy mildew

of cucurbits (*Pseudoperonospora cubensis*). The introduction gives general accounts of the weather, with maps, as affecting the crops and parasites, degrees of infection, and the effectiveness of the control measures adopted. Most of the rest of the publication is taken up with the reports of observers in various regions of the U.S.A. and Canada. The fungicide results for the states or provinces with reference to the diseases are tabulated.

2259. CALLBECK, L. C.

Results of spraying and dusting potatoes for late blight.

Amer. Potato J., 1949, 26: 155-60, being *Contr. Div. Bot. Plant Path. Sci. Serv. Dep. Agric., Ottawa*, 1968.

Four copper and four organic fungicides were tested against late blight of potato in Prince Edward Island during 1948 under severe epiphytotic conditions. Phygon XL gave outstanding control of late blight on the foliage, and in this respect it was followed closely by Parzate. The four copper fungicides were more effective than Dithane. It was evident that Phygon XL delayed the maturity of the plants. All plots treated with fungicides except those treated with Fungicide 629 gave yields significantly higher than the check plots at the 5% level. Spraying was superior to dusting with regard to both yield and disease control. [From author's summary.]

2260. LANSADE, M., AND ANSELME, C.

Essais de traitement du rhizoctone brun de la pomme de terre. (The control of stem canker in potato.)

Pomme de Terre franç., 1949, 12: 115: 15-18, bibl. 7.

Formaldehyde and solutions of certain organic mercury compounds were satisfactory for the control of stem canker of the potato (*Corticium (Rhizoctonia) solani*), but the treatment of tubers with dusts does not seem to be promising.—Station Centrale de Pathologie Végétale, Versailles.

2261. OLLILA, L.

Perunasyöpä. (Potato wart disease.) [English summary 7 ll.]

Rep. agric. Exp. Act. [Finland] 218, 1949, pp. 8.

The distribution of potato wart disease in Finland is shown on a map. Only immune varieties must be grown in areas declared as infected.—Tikkurila.

2262. HOLMBERG, C.

Fortsatta provodlingar å äldre potatis-kraftområden. (The persistence of potato wart disease in the field.)

Växtskyddsnotiser, 1949, No. 2, pp. 15-16.

The potato growing trials in fields naturally infected with the wart disease fungus were continued. Results so far show that under favourable circumstances, viz. intensive culture of immune varieties, the danger of infection ceases after 15 years, while the fungus may persist for at least 20 years in land converted to pasture.

2263. MUNCIE, J. H.

Reaction of potato varieties to infection by *Fusarium eumartii* Carpenter.

Quart. Bull. Mich. agric. Exp. Stat., 1949, 31: 270-4, bibl. 7.

Commercial potato varieties and seedlings were planted in steamed soil inoculated with the fungus. Apart from Teton, which was outstanding in freedom from disease, some of the unnamed seedling selections (developed for scab resistance) showed a high degree of resistance. The results indicate that breeding has a contribution to make to the control of *Fusarium* wilt in potato.

2264. LANSADE, M.
Recherches sur la fusariose de la pomme de terre *Fusarium caeruleum* (Lib.) Sacc. (The dry rot disease of potatoes.)
C. R. Acad. Agric. Fr., 1949, 35: 140-3 and *Pomme de Terre franç.*, 1949, 12: 116: 7-13, bibl. 10.

The symptoms of potato dry rot and the biology of the fungus are described. Resistant varieties are Saucisse, Rosa and Primula. The use of disinfectants on the tubers has not been very successful because of the damage caused, and control is chiefly directed to eliminating centres of infection by disinfecting surfaces or materials (e.g. sacks) that are likely to come in contact with the tubers.

2265. CONROY, R. J., AND OTHERS.
Tuber transmission of the spotted wilt disease of potatoes.
Agric. Gaz. N.S.W., 1949, 60: 101-3, bibl. 5.

A field experiment conducted at Hawkesbury Agricultural College in 1947 confirmed results of previous workers which showed that spotted wilt is carried over in the seed tubers but that, even when tubers from crops showing 100% infection were planted, only a small percentage of the resulting plants showed disease symptoms. Plants affected with spotted wilt yielded much less than healthy plants.

2266. WOLFENBARGER, D. O.
Nutritional value of phosphatic insecticides.
J. econ. Ent., 1948, 41: 818-19, bibl. 3.

It is suggested that the increases in potato yields, observed in plants treated with phosphatic insecticides, is due in part to the nutritional value of the phosphatic materials.

2267. MOROFSKY, W. F., AND MUNCIE, J. H.
Use of certain new materials in the control of potato insects in Michigan.
Amer. Potato J., 1948, 25: 255-9, being *J. Ser. Mich. State Coll.* 930.

DDT, parathion, 666 and other insecticides are compared. In both spray and dust plots "no treatment" was associated with highest yields, probably owing to the fact that the plants were not injured by the spraying and dusting equipment in the absence of serious infestations.

2268. SYLVESTER, E. S., AND MCLEAN, J. G.
Aphid control on potatoes.
Amer. Potato J., 1949, 26: 16-24, bibl. 4.

Both BHC and parathion produce a rapid kill of aphids and have a prolonged residual effect, but the former imparts a bad odour to the tubers and the latter is dangerous to handle. DDT-sulphur dust (DDT 5%, S 50%, carrier 45%), "although not resulting in a rapid kill, would appear to provide

adequate protection if applied early and frequently".—University of California, Berkeley.

2269. SAUER, E.
Über die Flora in der Umgebung von Höfchen im Zusammenhang mit Beobachtungen über Wirtspflanzen von *Myzodes persicae* Sulz. im Herbst 1948. (The flora of Höfchen with observations on host plants of *M. persicae* in the autumn of 1948.)
Höfchen Briefe, 1949, 2: 1: 25-32.

It is suggested that the potato industry would benefit from the repetition of such biological surveys elsewhere.

2270. VOSS, C. M., AND ANDRE, F.
Observations of aphids on potatoes in Northern Wisconsin, 1947.
Amer. Potato J., 1948, 25: 266-72.

As a result of comparative trials with insecticides and of more general considerations the use of DDT-oil emulsions is tentatively recommended to the grower.—Wisconsin Agric. Exp. Stat.

2271. FIDLER, J. H.
A three years' survey of potato aphids in north-east Yorkshire.
Ann. appl. Biol., 1949, 36: 63-75, bibl. 10.

This paper considers the suitability of north-east Yorkshire as a centre for the production of high-grade seed potatoes, taking the number of aphid vectors of virus diseases as the criterion. Counts of aphids were made during three consecutive seasons on selected fields on the higher land in this area. These counts are related to the various geographical, climatic and biological factors in each field and conclusions are drawn as to the most suitable districts within the area and the type of field which is likely to prove most satisfactory for this crop. [Author's summary].—N.A.A.S., Leeds.

2272. GIMINGHAM, C. T., AND THOMAS, I.
Colorado beetle in England, 1948.
Agriculture, 1949, 56: 65-70, bibl. 2.

The subject is discussed under: finds of single beetles, beetles intercepted on ships and at ports, and breeding colonies on potatoes in fields and gardens. 1948 provided a welcome contrast to 1947, as only 11 breeding colonies were reported compared with 57 the year before; finds of single beetles in crops other than potatoes were also much fewer, but many more were intercepted in ships. There are no grounds for complacency or relaxation of effort, and precautionary steps are being taken in 1949 on about the same acreage as last year.

2273. SMALL, T.
Colorado beetle in Jersey, 1948.
Agriculture, 1949, 56: 115-16, bibl. 2.

During the past two seasons extensive and costly measures have had to be taken in Jersey, not to combat the few hibernating beetles persisting in the Island, but mainly as a precaution against the possibility of heavy incursions of beetles from overseas. A similar position will arise in 1949. For this and other reasons the Island is particularly interested in the setting up of an International Committee on the control of the Colorado beetle in Europe. [From author's conclusion.]

2274. SCHWARTZ, M.
Kartoffelkäferresistenz. (Resistance to Colorado beetle.)
NachrBl. dtsh. PflSchDienst, 1948, 2: 65-9.
A satisfactory method of potato variety testing for resistance to Colorado beetle is described, which produces comparable results both over a period of years and for any given year.

2275. MAYNE, R., AND BRENY, R.
L'évolution doryphorique en 1948 et considérations sur l'opportunité des interventions chimiques de protection des champs de pomme de terre. (Infestations of the Colorado beetle in 1948 considered with regard to the application of insecticides.)
Parasitica, 1949, 5: 13-22.
Discusses the effect of weather on the outbreaks and severity of Colorado beetle attacks and how it affects control measures.

2276. QUEMERE, F.
Travaux du Laboratoire des Taupins. (Investigations of the click beetle laboratory.)
Pomme de Terre franç., 1949, 12: 114: 24-7.
A brief report on the studies carried out at Pleyber Christ on the biology and control of click beetles in the larval and adult stages.

2277. WOLFENBARGER, D. O.
Wireworm control studies on the lower southeastern Florida coast, 1946-47.
Proc. Fla St. hort. Soc. 60th annu. Meet. 1947, pp. 116-21, bibl. 2.
Experiments are reported in which partial control of wireworms was obtained by spraying soil with DDT about 6 months before planting potatoes, by treating soil with benzene hexachloride or by adding the chemical to the fertilizer and by fumigating with dichloropropane-dichloropropylene, or ethylene dibromide. The more promising results were obtained with the fumigants and benzene hexachloride. [From author's summary.]

2278. WOLFENBARGER, D. O., DECKER, P., AND RAWLINS, W. A.
Off-flavor of potato tubers produced by benzene hexachloride used for wireworm control.
Amer. Potato J., 1948, 25: 413-17, bibl. 4.
Tasters recorded off-flavour, especially in samples from higher dosage plots.

2279. MOSSOP, M. C.
Potato tuber moth [*Gnorimoschema operculella*].
Rhod. agric. J., 1949, 46: 14-16, bibl. 1, being *Ent. Advis. Circ.*, Dep. Agric. 1.
A popular description of this storage pest is followed by advice on control measures in S. Rhodesia.

2280. THOMPSON, H. W., ROEBUCK, A., AND COOPER, B. A.
Floods and the spread of potato root eelworm.
Agriculture, 1949, 56: 109-14, illus.
Investigations following the 1947 floods in England indicate that there has been no widespread heavy

infestation with potato root eelworm cysts of land previously free from the pest. There has been a spread in small numbers to new fields, but appreciable new infestation has been confined to flood margins. Moreover, the cysts carried were mainly those of low viability. There appears to be no evidence, therefore, that "potato sickness" has extended greatly as a result of the abnormal floods and, subject to good husbandry, the small degree of new infestation which has occurred need not be considered serious. The same remarks apply to the other cyst-producing eelworms attacking beet, peas, brassicas and cereals. [From authors' summary.]

2281. BOOCK, O. J.
O fumigante "Dowfume W-10" no controle aos Nematóides da batatinha. (The fumigant Dowfume W-10 for the control of potato eelworms.)
Rev. Agric. S. Paulo, 1949, 24: 25-42, bibl. 2.

Trials with Dowfume W-10 (containing as active principle ethylene bromide) for fumigating soil in the control of the potato eelworm, *Heterodera marioni* (Cornu) Goodey, are described. Applications were made with an injector, at about 12 to 15 cm. depth and 20 and 40 cm. apart, at the rate of 30 gal. per acre. The best results were obtained when applications were made 20 cm. apart and one to two weeks before planting.

2282. LUBATTI, O. F., AND SMITH, B.
Determination of fumigants. XX. Sorption of methyl bromide by potatoes.
J. Soc. chem. Ind. Lond., 1948, 67: 347-54, bibl. 13.

The effect of the following factors on the sorption of methyl bromide by potatoes has been determined: concentration of fumigant, period of exposure, size of tubers, temperature, maturity, induced sprouting and variety. At the concentration-time product studied residual methyl bromide is small and becomes negligible after 5 to 10 days. A few experiments on the sorption of methyl bromide by light loamy soil were carried out. [Authors' abstract.]—Imperial College Field Station, Silwood Park, Sunninghill, Berks.

Tobacco.

(See also 1911, 1929, 2563-2566, 2599, 2601.)

2283. ANON.
Tobacco growing [in England].
Gdnrs' Chron., 1948, 123: 132-3, bibl. 6.
The Royal Botanic Garden, Kew, and the Royal Horticultural Society, Wisley, note that although the growing and curing of tobacco is illegal except under licence, the Board of Customs and Excise have indicated that no action will be taken against persons growing a small number of plants solely for their own use. A few useful notes to help anyone wishing to do so are given.

2284. ANON.
Tobacco growing. [Use of electricity for soil heating].
Elect. Rev., Lond., 1948, 143: 869 from *Brit. Abs.*, 1949, BIII, p. 111.

Heating the soil in which tobacco seeds are germinated is carried out in glass cloches, by means of bare galvanized Fe wires, arranged zig-zag and running 6 in. below the soil surface. Germination takes place within 14 days. Electrically-heated curing barns are also briefly considered.

2285. WOLF, F. A.

Turkish or Oriental tobacco [in U.S.A.].

Econ. Bot., 1949, 3: 32-41, bibl. 8, illus.

Field and laboratory experiments that have been in progress for 9 years have shown that Turkish type tobacco can be grown successfully in the Piedmont and mountain areas of Virginia and North and South Carolina. Some factors affecting quality of Turkish tobacco are summarized, and field practices that will improve quality are suggested. Close planting ($20 \times 5\frac{1}{2}$ in.) and the use of infertile soils is recommended to induce slow growth and small leaves of the desired texture and chemical composition. Small dressings of well decayed manure give better results than artificial fertilizers, although an application of sulphate of potash, at 80-100 lb. per acre, will improve quality by increasing the cuticularization of the leaves. Notes are given on harvesting, curing, baling and grading methods.

2286. STREET, O. E.

Producing cigar tobacco in Pennsylvania.

Fmrs' Bull. U.S. Dep. Agric. 2001, 1948, pp. 32, bibl. 3, illus.

Tobacco production in Pennsylvania is limited to two cigar-leaf types—Pennsylvania Seedleaf, or Broadleaf, a filler type (98% of acreage), and Pennsylvania Havana Seed, a binder type. Recommendations are made on seedbed management, cultural practices, manuring and fertilizing, cropping systems, seed selection, curing, handling, packing, fermentation, and disease control. Lancaster County has over 90% of the total tobacco acreage in the State.

2287. WOLF, F. A.

Production, in Venezuela, of indigenous varieties of tobacco.

Econ. Bot., 1949, 3: 132-9, bibl. 4, illus.

The peasant methods of cultivation, harvesting and processing, that have apparently remained unchanged for over 450 years, and the leaf characters of indigenous varieties are described. The production of excellent quality cigar tobacco by these methods makes them of general interest. It is suggested that the indigenous Venezuelan varieties may have value for hybridization with Virginian and Burley varieties, to increase resistance to drought and disease.

2288. BENNETT, H.

Flue-cured tobacco from Nyasaland.

Bull. imp. Inst. Lond., 1948, 46: 227-30.

A report on 6 flue-cured leaf samples from the 1948 Kasungu crop. Five of them were "very promising as cigarette leaf".

2289. KINCAID, R. R.

Three interspecific hybrids of tobacco.

Phytopathology, 1949, 39: 284-7, bibl. 9, illus.

Fertile hybrids were obtained between *Nicotiana*

tabacum L., cigar-wrapper variety Rg, as the pistillate parent, and *N. debneyi*, *N. repanda*, and *N. plumbaginifolia*. They all resembled the *N. tabacum* parent much more closely than they did the other parent.

2290. LAŠUK, G. I.

The importance of the various parts of the root system in the synthesis of alkaloids in tobacco plants. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 64: 145-8.

In one experiment the distribution of alkaloid in tobacco roots was investigated by inserting pieces of tobacco roots into tomato plants and later analysing the tomato leaves for alkaloid. The results indicated that the part of the roots most active in producing alkaloids was the primary root and its growing point. In another experiment, to determine the influence of the root functions on alkaloid production, young tobacco stems were grafted on tomato stems and each union then enclosed in two half plant-pots, sealed together and filled with a neutral substratum to which was added one of a number of nutrient substances. It was concluded that alkaloid synthesis depended not on the root activity itself but on the process of root development in which the whole plant played a part.

2291. LAŠUK, G. I.

The effect of root formation on the synthesis of alkaloid in species of *Nicotiana*. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 64: 405-8, bibl. 7.

The author restates his theory that the synthesis of alkaloids in tobacco is associated with the development of the primary root, which is itself dependent on the activities of the plant as a whole, and he presents experimental data as evidence, viz.: (1) Decapitated tobacco plants produced more alkaloid than do normal plants, the products of assimilation being directed to the roots in the former. (2) A piece of potato stem was grafted on a tobacco root and then itself grafted with tobacco. The piece of potato stem was kept shaded to induce tuber formation. Four plants so formed produced 0, 3, 7 and 12 tubers respectively from the potato parts. The alkaloid content of the potato leaves and the tobacco roots increased as the number of tubers decreased, but there was no such correlation in the tobacco leaves. (3) Leaves from tobacco grafted on tomato and not containing alkaloid were cut off, rooted in boxes and later planted out. When shoots were expected to start developing, the leaves were divided along the midrib and half leaves removed and analysed for presence of alkaloid, the other halves, the shoots and the roots, being analysed at the end of the experiment. The results showed that as shoots developed the accumulation of alkaloids in the leaves diminished. (4) Tobacco shoots not containing alkaloid, were taken from plants grafted on tomato and, placed in a moist, shaded chamber. Under such conditions alkaloids could be formed only at the expense of substances already present in the shoots. It was found that not only did alkaloids develop in the shoots producing roots but also in those where only root initials were present as well as shoots and leaves.

2292. STEINBERG, R. A.

Growth responses to organic compounds by tobacco seedlings in aseptic culture.*J. agric. Res.*, 1947, 75: 81-92, bibl. 9, illus.

Seedlings of the Robinson strain of tobacco, Maryland Medium Broadleaf, were grown for 28 days in 200 c.c. Pyrex Erlenmeyer flasks under aseptic conditions at 25° C. with 500 foot-candles of fluorescent white light. Each flask contained 50 c.c. of a mineral-agar medium. Of about 60 sugars, amino acids, vitamins, and peptones added to the medium only sucrose, D-glucose, D-fructose, and perhaps D-xylose were definitely beneficial to growth. Other compounds, particularly amino acids, were toxic at concentrations of 5 to 200 p.p.m. A specific toxicity response to *dl*-isoleucine duplicated most of the gross characteristics of the disease known as frencing. It was possible to correct partially, by addition of D-mannose and certain peptones, failure to pass through the rosette stage under daily short illuminations. [From author's summary.]

2293. GEORGIA COASTAL PLAIN EXPERIMENT STATION.

Fertilizing flue-cured tobacco.*Pap. Ga Coast Pl. Exp. Stat.* 16, 1948, pp. 2, mimeographed. *Soils from Fert.*, 1949, Vol. 12, Abstr. 1020.

On average Georgia soils, 1,000-1,200 lb./acre of 3-9-9 fertilizer are sufficient for flue-cured tobacco; Cl, Mg, Ca and S are also essential for high yields and good leaf quality. Seedlings should not be transplanted directly into or immediately above a band of fertilizer, but the fertilizer should be placed in bands 3-4 in. to the side of the row or should be mixed with the soil before listing. Not more than 1,000 lb. should be applied in the row before planting and the rest as a side-dressing at the first cultivation or not later than 20 days after transplanting. Where additional N is necessary it should be applied with K and should not exceed 15 lb./acre. Not less than one-fifth of the N should be derived from high-grade organic sources such as cottonseed meal, not less than one-fifth from nitrates and the rest from other inorganic materials.

In the K fertilizer, mixtures of muriate, K_2SO_4 and $K_2SO_4 + MgO$ are recommended. More than 2% of Cl in most soils reduces the fire-holding capacity of the cured leaf. Wherever side-dressings are required, K_2SO_4 is recommended. Mg may be supplied in $K_2SO_4 + MgO$ or as dolomite. For seedbeds 1 lb./sq. yard of a 4-9-3 or 3-9-6 fertilizer should be worked into the soil over 2 in. deep a few days before sowing. Where cyanamide has been used, $\frac{1}{4}$ lb. of fertilizer is sufficient. Most of the N should be slowly available, but excessive amounts of organic materials should be avoided. One quarter of the N should be organic, one quarter from nitrates and half from other inorganic fertilizers. K fertilizers should contain no Cl. The fertilizer should carry 1% of MgO.

2294. MEHRING, A. L.

Consumption and composition of tobacco fertilizers.*Agron. J.*, 1949, 41: 240-6, bibl. 13.

"The purpose of this report is to give an analysis of the available statistics on tobacco fertilization with a

view to determining the trends in usage and future requirements." The tobacco acreage, yield and estimated fertilizer requirement in the United States is recorded from 1906 to 1948, and the changes in application rates and grades and composition of mixed fertilizers are discussed. It is considered that, owing to changes in usage, the average total plant food content of mixed fertilizers for tobacco should be increased from 18.74% in 1947 to at least 20% in 1949.—U.S.D.A., Beltsville, Md.

2295. BALD, J. G.

A method for the selective staining of viruses in infected plant tissues.*Phytopathology*, 1949, 39: 395-402, bibl. 11.

Sections of tobacco leaves with mosaic, when fixed in Karpechenko's fluid, pretreated with iodine-potassium iodide solution and stained with Giemsa-orange G, showed the virus as striate material stained purple.

2296. STEINBERG, R. A., AND CLAYTON, E. E.

Chemical soil treatment for black root rot of tobacco in the greenhouse.*Phytopathology*, 1949, 39: 155-7.

The experiments described were carried out on plants in one-gallon crocks (four seedlings in each). Of the compounds investigated, urea, sodium azide, hexamethylenetetramine, and sodium nitrite showed most promise. Sodium azide was most effective of all the chemicals tried, 0.5 and 1.0 g. per crock giving good root-rot (*Thielaviopsis basicola*) control with two crops of seedlings.—Plant Industry Station, Beltsville, Maryland.

2297. GRUŠEVOJ, S. E.

The use of perennial leguminous plants in the control of broomrape and black root rot in tobacco rotations. [Russian.]*Doklady vsesojuz. Akad. sel'sk. Nauk S.S.S.R.*, 1949, No. 2, pp. 17-21.

It was found that certain leguminous plants not susceptible to infection by the tobacco broomrape (*Orobanche ramosa*) induced the germination of its seeds and so tended to free the ground from the parasite. Such plants showed different degrees of susceptibility to black root rot (*Thielavia basicola*). It is suggested that for rotation with tobacco a crop should be selected which will reduce the number of viable seeds of *Orobanche* and at the same time will check infestation of the soil with *Thielavia*.

Hops.

(See also 2637.)

2298. DARK, S. O. S.

The hop breeder's problem.*A.R. Dep. Hop Res. Wye Coll.* 1948, 1949, pp. 49-53.

A brief discussion of the breeding methods available for the improvement of hop varieties, and an estimate of past achievements and future possibilities.

2299. WILKINSON, E. H.

Hop-growing in the West Midlands [of England].*Agriculture*, 1949, 56: 160-2.

Of approximately 22,800 acres under hops in England in 1948 about one-third were in the West Midlands

(Herefordshire and Worcestershire). Four main varieties are grown: Fuggle (75% of area), Bramling, Early Bird, and Mathon. The Worcester system of growing hops, the methods used for controlling pests and diseases, picking and drying operations are described. Virus diseases are the greatest cause of loss to growers. The "progressive" form of *Verticillium* wilt, which causes serious losses in S.E. England, has not been recorded.

2300. LAMBERT, J. G.

Note sur le système racinaire du houblon.

(Note on the root system of the hop.)

Ann. Gembl., 1949, 55: 88-90, bibl. 2, illus.

A study of the root system of the Tettang variety of hop on two soil types, (a) a stiff, moist loam with a high water table, and (b) a stiff loam, relatively dry and well-drained. The two types of root system observed, horizontal and fibrous, and vertical, fleshy and non-fibrous respectively, accorded with observations made by Beard (*H.A.*, 13: 1371) on other varieties, and with his conclusion that the type of root development in hops is not a varietal character but varies according to soil. A method is outlined by which the relationship between root development and soil conditions may be investigated.

2301. GOLUBINSKIJA, I. N., AND ŠČERBINA, L. G.
The dynamics of the accumulation of the bitter substances of hop cones during their development. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 65: 177-9.

Data are given showing the amount of resins in hop cones as they develop, ripen and become overripe. The author concludes that the value of the hops is not noticeably impaired when they pass the stage of technical maturity.

2302. THOMPSON, F. C.

The nutrition of the hop plant. A review of the literature.

Rep. Dep. Hop Res. Wye Coll. 1948, 1949, pp. 20-31, bibl. 37.

The author briefly reviews foreign and English literature and as regards manuring sums up as follows:— 1. Deficiency symptoms for a range of plant nutrients have been described from the results of pot and water culture experiments. 2. The need for high levels of nitrogen and potassium has been demonstrated. 3. The results of English experiments have shown that wide variations in the time of application of nitrogenous top dressings have little effect on the crop, though an early application is considered desirable. Continental work, however, suggests that a very late application may also be beneficial. 4. It has been shown that so long as sufficient humus is added to the soil to prevent deterioration of the physical structure, there is no special virtue in using organic fertilizers for hops. 5. No simple relation between manuring and the resin content of hops has been found.

2303. PIZER, N. H., CRIPPS, E. G., AND THOMPSON, F. C.

Hop *Verticillium* wilt. An account of soil and nutrition investigations at Wye in the years 1944-47.

A.R. Dep. Hop Res. Wye Coll. 1948, 1949, pp. 32-48, bibl. 6.

An account of an extensive study of soil and nutritional conditions in hop gardens in relation to the incidence of *Verticillium* wilt. Petiole analysis consistently showed nutritional differences between apparently healthy Fuggle hops in healthy and infected gardens, calcium and silica levels being higher and nitrogen lower in infected gardens. As soil analysis revealed no significant difference between healthy and infected soils, the level of petiole calcium was not caused by the level of soil calcium. It is suggested that high and low calcium strains of Fuggle hops may exist, and the low calcium strain may be less susceptible to *Verticillium* wilt. The possibility and effect of depressing the calcium level of the plants by applications of sodium salts to the soil is also considered worth investigation.

Medicinal plants.

2304. MITRA, G. C.

Indian medicinal plants and their cultivation.

J. sci. industr. Res. India, 1948, 7A: 319-21

Brit. Abs., 1949, BIII, p. 14.

Drug plants cultivated in India and indigenous plants suitable for cultivation are listed, with a brief discussion of harvesting, extraction, and storage.

2305. SIEVERS, A. F.

Production of drug and condiment plants.

Fmrs' Bull. U.S. Dep. Agric. 1999, 1948, pp. 99, bibl. 14, illus., 30 cents.

The growing, harvesting, curing, processing, and marketing of the following plants is discussed: Aconite, Althea, Angelica, Anise, Arnica, Basil, Belladonna, Boneset, Burdock, Calendula, Camomile (German and English), Caraway, Castor-bean, Catnip, Cayenne, Celery, Colchicum, Coriander, Cumin, Dandelion, Digitalis, Dill, Echinacea, Elecampane, Fennel, Gentian, Ginger, Ginseng, Goldenseal, Henbane, Horehound, Larkspur, Lavender, Licorice, Lobelia, Lovage, Marjoram, Melissa, Mustard, Orris, Paprika, Parsley, Pennyroyal, Peppermint, Pinkroot, Pockeroot, Sage, Senega, Sesame, Spearmint, Stramonium, Tansy, Tarragon, Thyme, Valerian, Valerian, Wintergreen, Wormseed (American), Wormwood.

2306. MOLDENHAWER, K.

Doświadczenia nawozowe z roślinami leczniczymi. (Manurial experiments with medicinal plants.) [English summary 10 ll.]

Przegląd Doświadczeń rolniczego Poznań, 1947, 3: 223-41, bibl. 42.

The author has reviewed the results of manurial experiments with medicinal plants published in Polish, English, French, Russian and German works up to 1939 inclusive, with reference to the most important of such plants grown in Poland.

2307. ARENS, L. E.

The clematis birthwort as a native medicinal plant. [Russian.]

Priroda, 1949, No. 2, pp. 61-2, bibl. 4.

In European Russia the clematis birthwort (*Aristolochia clematitis* L.) is the only representative of the genus. It has toxic properties due to its alkaloid, aristolochin, which appears to be present in all parts of the plant but particularly in the seeds and roots. Reference is made to its healing properties when leaves are applied to ulcers.

2308. SELLSCHOP, J.

The dwarf castor oil plant.*Fmg S. Afr.*, 1949, 24: 202-4, bibl. 5, illus.

An article written mainly for the guidance of South African growers who are interested in the dwarf Mauthner type (2½-5½ ft.) imported from Hungary. It is recommended that seed be sown 6 in. apart in rows 2½ to 3 ft. apart at the rate of 50 lb. per morgen (1 morgen=2.116 acres). Yields are quoted. The oil content of the seed is given as 46%.

2309. YOUNGKEN, H. W., AND HASSAN, W. E., Jr.

Camphor basil, *Ocimum kilimandscharicum* Gürke.*J. Amer. pharm. Ass.*, 1948, 37: 360-3 from *Brit. Abs.*, 1949, II B, p. 95.

The plant can be grown as a half-hardy annual in the north-west of the U.S.A.; its dried leaves and flower spikes yielded (dry weight) camphor 2.54%, and oil 2.5%, both similar to the products of the camphor laurel. Its morphology and histology are described.

2310. PRASAD, S.

Effect of pruning and exfloration [disbudding] on growth and alkaloid content of *Datura metel* L.*J. Amer. pharm. Ass.*, 1948, 37: 346-9 from *Brit. Abs.*, 1949, BIII, p. 66.

Pruning reduces the number of leaves, height and dry weight, the effect increasing with the severity of pruning, but disbudding (even partial) significantly increases these three values. The alkaloid content is unaffected by pruning, but is increased (up to 75%) by disbudding, and further increased (up to 100%) by treatment with $(\text{NH}_4)_2\text{SO}_4$.

Fibres and other crops.

(See also 1764, 2529e, 2567, 2568.)

2311. JACKSON, W. L.

Phormium tenax*, New Zealand flax.E. Afr. agric. J.*, 1949, 14: 194-5, bibl. 2.

A note by a Kenya planter on his experience with this crop for which he claims these advantages, amongst others: it is a perennial, so that the first 3 years cover all the planting and cultivation costs; it is drought-resistant; it can be cut at any time of the year; it is an outstanding soil renovator; once established, it will absolutely stop erosion; when it is closely planted, couch grass can make no headway under it.

2312. MÜHLETHALER, K.

Electron micrographs of plant fibers.*Biochim. Biophys. Acta*, 1949, 3: 15-25, bibl. 12, illus.

In the past the technique for preparation of plant fibres for electron micrographs has been very unsatisfactory. At the National Institute of Health, Bethesda, Md, however, the difficulties of preparation have been largely overcome. Cell walls of ramie, cotton, flax, sisal and wood were examined with the electron microscope and photographs of unaltered cell wall structures were obtained. Some of these remarkable micrographs are reproduced, and the structure of cellulose and non-cellulose systems in the different fibres is described.

2313. KOCH, P.

The development of the "Wildestokroos" fibre industry [in S. Africa].*Fmg S. Afr.*, 1949, 24: 211, illus.

A very brief note announcing that 2,400 acres of wildestokroos [*Hibiscus cannabinus* or kenaf] were planted at Nelspruit, Eastern Transvaal, last season for the production of fibre to be used in the manufacture of bags. It has already been proved that this fibre plant, if properly fertilized and cultivated, adapts itself well to the Low Veld, often growing to a height of 7 to 9 ft.

2314. CLAASSEN, C. E.

Safflower.*Econ. Bot.*, 1949, 3: 143-9, bibl. 10, illus., reprinted from *Chemurgic Digest*, 1948, 7 (3): 11.

As a result of an extensive breeding programme at the University of Nebraska, a variety of safflower (*Carthamus tinctorius*) has been developed that has a 34% oil content. "The purpose of this article is to stimulate interest in safflower as a source of oil and meal in [the semi-arid] areas where it is adapted; to present recent data on varietal and cultural tests; to discuss some of the accomplishments and possibilities in breeding for higher oil content; and to present the current status of commercial production in the United States."

2315. DAVIDSON, D. F. D.

Report on the gum mastic industry in Chios.*Bull. imp. Inst. Lond.*, 1948, 46: 184-91, illus.

The report describes: *Pistacia lentiscus* var. Chia (*Anacardiaceae*), a cultivated, evergreen, dioecious shrub yielding gum mastic; the present organization of the industry; methods of propagation and cultivation; mastic collection; processing and grading. Notes are given on output and cost of production. The plant is propagated by cuttings, needs similar treatment to the olive, requires 6 years before it begins to yield, and does not reach its maximum yield until after 50 years. The market for the product is fully met by Chios where the industry is well organized on a cottage industry basis.

2316. TAYLOR, C. A.

Observations on the storage and germination characteristics of angelica seed.*Proc. Amer. Soc. hort. Sci.*, 1948, 52: 471-4, bibl. 4.

In tests in California it was found possible to store seed of *Angelica archangelica* for 8 months without serious loss of viability. The best of the 3 storage conditions tried was sealing in a full airtight container held at 35° F. and the best germinating temperatures were 42° F. for 16 hours followed by 77° F. for 8 hours daily.

2317. BERNADOWSKI, J.

Możliwości uprawy kok-saghyz'u czyli Mniszka karczokodajnego (*Taraxacum kok-saghyz*) w Polsce. (The possibilities of cultivating kok-saghyz in Poland.) [English summary 7 ll.]*Przegląd Doświadczalnictwa rolniczego, Poznań*, 1947, 3: 194-200, bibl. 4.

Tables show the influence of the time of sowing on the density of plants of kok-saghyz and the percentage of

rubber in plants gathered at various times. The author considers that, under good conditions, the yield in Poland is 88 q. per ha.

Noted.

2318.

- a ADAMS, R., AND GOVINDACHARI, T. R.
Senecio alkaloids: α - and β -longilobine from *Senecio longilobus*.
J. Amer. chem. Soc., 1949, **71**: 1180-6, bibl. 17.
- b ANDREAE, S. R., AND ANDREAE, W. A.
The metabolism of scopoletin by healthy and virus infected potato tubers.
Canad. J. Res., 1949, **27**, Sec. C, pp. 15-22, bibl. 13.
- c BERAN, F.
Auftreten und Bekämpfung des Kartoffelkäfers in Österreich im Jahre 1948. (Incidence and control of the Colorado beetle in Austria in 1948.)
PflSch. Ber. Wien, 1949, **3**: 17-25, bibl. 3.
- d BERGER, K. C.
Soil fertility investigations with potatoes in Wisconsin.
Amer. Potato J., 1948, **25**: 377-86, bibl. 5.
- e BLACK, W. A. P.
The seasonal variation in chemical composition of some of the littoral seaweeds common to Scotland. Part I. *Ascophyllum nodosum*.
J. Soc. chem. Ind. Lond., 1948, **67**: 355-7, bibl. 11.
See also *H.A.*, 19: 497h, i.
- f BONNER, J., AND ARREGUIN, B.
The biochemistry of rubber formation in the guayule. I. Rubber formation in seedlings.
Arch. Biochem., 1949, **21**: 109-24, bibl. 26.
- g BRIGGS, L. H., MANGAN, J. L., AND RUSSELL, W. E.
Alkaloids of New Zealand *Senecio* species. Part I. The alkaloid from *Senecio kirkii*.
J. chem. Soc. Lond., 1948, pp. 1891-2.
- h BRUMMER, V.
Vesijärven ja tammiston aikaisen suhtautumisesta perunavirooseihin. (The susceptibility to virus diseases of the potato varieties Harbinger and Tammisto Early in Finland.) [English summary 8 ll.]
Maataloust. Aikakausk., 1949, **21**: 17-28, bibl. 11.
- i BUSHNELL, J.
Fertilizer and cultural experiments with potatoes reported during 1944-1946.
Amer. Potato J., 1948, **25**: 329-33, bibl. 71.
A brief review of the literature.
- j CURTIS, L. C.
The use of naked seed in *Cucurbita pepo* as a source of high quality liquid vegetable fat, as a high analysis protein, as a new confection, and as a sandwich spread.
Proc. Amer. Soc. hort. Sci., 1948, **52**: 403-6, bibl. 11.

- k DEPARTMENT OF AGRICULTURE FOR SCOTLAND.
New Scottish potato variety.
Scot. Agric., 1949, **28**: 232.
Craig's Alliance, immune to wart disease.
- l DUNN, J. A.
The parasites and predators of potato aphids.
Bull. ent. Res., 1949, **40**: 97-122, bibl. 22.
- m EICHLER, W., AND MÜLLER, W.
Der Schierlingsrüssler (*Lixus iridis*) als Schädling des Liebstöckels (*Levisticum officinale*). (*Lixus iridis*, a pest of lovage.)
NachrBl. dtsh. PflSchDienst, 1948, **2**: 46-8, bibl. 12.
- n FARM MECHANIZATION ENQUIRY.
Mim. Report on a study of pea harvesting summer 1947.
National Institute of Agricultural Engineering, Silsoe, Beds., 1948 [?], pp. 6.
- o FELTON, M. W., AND LIVINGSTON, J. E.
Seed and soil treatments for vegetable crops grown in Nebraska.
Circ. Neb. agric. Exp. Stat. **86**, 1948, pp. 19.
- p GHISLENI, P. L.
La biologia dell'asparago. (*Asparagus biology*).
Ital. agric., 1949, **86**: 313-29, bibl. 25.
- q HARTMAN, J., AND OESTERLE, E.
Effect of frequency of picking tomatoes on yield and returns.
Proc. Amer. Soc. hort. Sci., 1948, **52**: 383-4.
- r HEWITT, E. J., JONES, E. W., AND WILLIAMS, A. H.
Relation of molybdenum and manganese to the free amino-acid content of the cauliflower.
Nature, 1949, **163**: 681-2, bibl. 10.
- s JANCKE, O.
Der grosse Rapsstengelrüssler (*Ceutorhynchus napi* Gyll.) als Kohlschädling. (The rape pest *C. napi* as a pest of cabbage.)
NachrBl. dtsh. PflSchDienst, 1943, **23**: 7-8, bibl. 1 [received 1949].
- t KUNG, H. P., AND HUANG, W.-Y.
Chemical investigation of *Draba nemorosa* L. The isolation of sinapine iodide [from *Draba nemorosa*].
- u KUNKEL, R., SCHAAL, L. A., AND BINKLEY, A. M.
The relationship between maturity, yield, color and cooking quality of early-crop Triumph potatoes.
Amer. Potato J., 1949, **26**: 132-7, bibl. 2.
- v LAUFFER, M. A., AND ROBINSON, G.
The effect of glycerine and aniline on tobacco mosaic virus infectivity.
Arch. Biochem., 1949, **22**: 119-21, bibl. 4.
- w LEISEGANG, E. C., AND WARREN, F. L.
The *Senecio* alkaloids. Part II. Isatine-cine.
J. chem. Soc. Lond., 1949, pp. 486-7.

- x LINN, M. B., APPLE, J. W., AND ARNOLD, C. Y.
Leafhopper control with DDT in relation to length of season, quality and yield of seventeen potato varieties.
Amer. Potato J., 1948, 25: 315-18, bibl. 20.
 - y LUTZ, J. M., WRIGHT, R. C., AND EDGAR, A. D.
Research on harvesting, transportation and storage of potatoes—a review of recent literature.
Amer. Potato J., 1948, 25: 437-45, bibl. 45.
 - z MOORE, W. D., STODDARD, D. L., AND SAVAGE, C. B.
Present status of the mosaic disease of vegetable crops in south Florida.
Proc. Fla. St. hort. Soc., 60th annu. Meet. 1947, pp. 128-31 [received 1949].
- 2319.
- a MORRISON, E. M.
Cost and efficiency of celery production in Box Elder and Utah Counties in 1945 and 1947.
Bull. Utah agric. Exp. Stat. 332, 1949 (?), pp. 28.
 - b PADDOCK, E. F.
Effects on tomatoes of field application of two hormone-insecticide-fungicide mixtures.
Proc. Amer. Soc. hort. Sci., 1948, 52: 365-7, bibl. 1.
Negative results.
 - c PARRIS, G. K.
Watermelon disease control [in Florida].
Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 147-50 [received 1949].
 - d POTATO ASSOCIATION OF AMERICA.
Abstracts of papers presented at the Annual Meeting of the Potato Association of America, Pittsburgh, Pa, December, 1948.
Amer. Potato J., 1949, 26: 90-104.
 - e PUCHER, G. W., AND VICKERY, H. B.
The metabolism of the organic acids of tobacco leaves. 1. Effect of culture of excised leaves in solutions of organic acid salts.
J. biol. Chem., 1949, 178: 557-75, bibl. 25.
 - f RICHARDSON, L. T., AND GOODIN, R. E.
Five years of bacterial ring rot.
Amer. Potato J., 1949, 26: 85-9.
The report of a survey conducted in Ohio.
 - g ROSENQUIST, C. E.
Effect of drift of 2,4-D spray on Irish potatoes.
Amer. Potato J., 1949, 26: 80-1, bibl. 3.
Drift caused injury and a reduction in yield.
 - h SALZMANN, R.
Ueber das Vorkommen virusübertragender Blattläuse auf Kartoffeln im Sommer 1948. (The incidence of aphid vectors on potatoes in the summer of 1948 [in Switzerland].)
Reprinted from *Schweiz. landw. Z., Die Grüne*, 1949, No. 3, pp. 3-7.
 - i SCHAAL, L. A.
The reaction of Pawnee and Bliss Triumph potatoes to certain physiologic races of *Actinomyces scabies*.
Amer. Potato J., 1948, 25: 427-31, bibl. 2.
 - j SCHADE, A. L., AND OTHERS.
Studies on the respiration of the white potato. III. Changes in the terminal oxidase pattern of potato tissue associated with time of suspension in water.
Arch. Biochem., 1949, 20: 211-19, bibl. 2.
 - k SIEBENEICHNER, H.
Erfahrungen beim Blumenkohlsamenbau unter holsteinischen Verhältnissen. (Cauliflower seed production in Holstein, Germany.)
Ceres, Hamburg, 1949, 2: 3: 8-10.
 - l SNYDER, L. C.
Vegetable variety tests.
Minn. Hort., 1949, 77: 24-5.
 - m STEINBERG, R. A.
Growth responses of tobacco seedlings in aseptic culture to diffusates of some common soil bacteria.
J. agric. Res., 1947, 75: 199-206.
Xanthi Turkish tobacco seedlings used.
 - n STUBBS, L. L.
A new virus disease of carrots [in Australia]: its transmission, host range, and control.
Aust. J. sci. Res., B., 1948, 1: 303-32, bibl. 25, illus.
 - o THOMPSON, R. C., AND KOSAR, W.
Vernalization and seed stem development in lettuce.
Proc. Amer. Soc. hort. Sci., 1948, 52: 441-2, bibl. 3.
Results at Beltsville, Md, negative.
 - p UBRIZSY, G.
Vizsgálatok a csiperkegomba és más nagygombák transpirációs viszonyairól. (The transpiration of *Psalliota campestris* and that of other fungi.) [French summary $\frac{1}{2}$ p.]
Bull. Fac. Hort. Budapest, 1948, 12: 210-16, bibl. 10.
 - q W., C. E.
The potato in Fiji.
Agric. J. Dep. Agric. Fiji, 1948, 19: 36-8, bibl. 1.
 - r WALLACE, T.
Nutrition of farm crops. VII, VIII and IX. Nutrition and manuring of vegetables, Bush and cane fruits and strawberries, Tree fruits.
Farming, 1949, 3: 135-9, 166-71, 199-204.
Practical and popular articles by a leading British expert.
 - s WENE, G. P.
A helicopter for vegetable insect control.
J. econ. Ent., 1948, 41: 831-2.
 - t WRIGHT, R. C., AND WHITEMAN, T. M.
A progress report on the chipping quality of 33 potato varieties.
Amer. Potato J., 1949, 26: 117-20.

FLORICULTURE.

General.

(See also 1736-1744, 1997, 2058-2060, 2082, 2083, 2089c, 2576, 2601, 2610.)

2320. DESAI, B. L.

A glimpse at the gardens of the world.

Poona agric. Coll. Mag., 1949, **39**: 4-9.

Having stated that the most important factor influencing a country's gardens is the temperament of its people, the author attempts to define the style of gardening found in China, Japan, Russia, Sweden, Holland, Germany, France, Italy, Spain, Portugal, England, and the U.S.A.

2321. DESARZENS, A. F.

Aménageons notre petit jardin. (The lay-out of private gardens.)

Rev. hort. suisse, 1949, **22**: 191-9, illus.

The above is the first of 21 illustrated articles (pp. 191-261) dealing with the lay-out of the smaller type of private garden in Switzerland.

2322. LPK.

Pescia ergänzt San Remo. (Pescia and San Remo for flowers.)

Gärtnermeister, 1949, **52**: 179.

A short note on Pescia, the new important centre of flower production in Italy. It changed from vegetable to flower production in 1945. Its season, May to November, is complementary to that of San Remo.

2323. DESHUSSES, L.-A.

Les nitrites, poisons du sol. (Nitrites as soil poisons.)

Rev. romande Agric. Vitic., 1949, **5**: 33-4.

In two specified cases failure of flower seedlings was shown to be due to a nitrite content of the soil of 6 and 10 p.p.m. respectively and not to the causes suspected by the growers. The results of experiments carried out at the Laboratoire de Chimie Agricole, Geneva, suggest the following precautions to avoid nitrite poisoning: (1) After steam sterilization expose the soil to the air for a week or, if possible, for a fortnight, before sowing or pricking out. (2) Prepare the soil mixture and add organic manure (dried blood, etc.) to the compost at least a month before using them. (3) For sowing and pricking out a mixture of sand and peat is preferable to a soil rich in decomposed organic matter. The former may be treated with a 0.05-0.1% fertilizer solution. (4) If a compost from garden refuse is used, have it tested for the presence of nitrites in a toxic concentration.

2324. M.

Eine Schweizer Topfwaschmaschine. (A new Swiss machine for washing plant pots.)

Gärtnermeister, 1949, **52**: 195.

A description and illustrations of a new, electrically-driven machine for washing plant pots containing saleable plants. The saving of time, as compared with hand washing, is claimed to be at least 50%.

2325. SEELEY, J. G.

Vermiculite for rooting cuttings.

Bull. N.Y. St. Flower Gr. **45**, 1949, pp. 4-7.

In experiments carried out at Cornell University both medium and coarse grades of Terralite and Mica-Gro

vermiculite gave good results as a rooting medium for saintpaulia, geranium and rose cuttings. In general the cuttings rooted more quickly in vermiculite than in sand. Best results were obtained when the cuttings were inserted 2 in. deep in the vermiculite. When automatic watering is used, the base of saintpaulia cuttings should be 1 in., and of rose cuttings $\frac{1}{2}$ - $\frac{3}{4}$ in., above the water level.

2326. DICKEY, R. D.

[Micro-element] deficiencies in ornamentals [in Florida].

Proc. Fla. St. hort. Soc. **60th annu. Meet.** 1947, pp. 199-203, bibl. 7, illus. [received 1949].

So far the only micro-elements reported to be deficient in ornamental plants in Florida are manganese, zinc, and iron, each of which is discussed.

2327. ANON.

Plastic preservative.

Amer. Nurserym., 1949, **89**: 8: 54-6.

A preparation known as Good-rite vinyl resin latex, a colloidal dispersion of vinyl resin in water, has been widely tested at Cleveland, Ohio, as a protective coating for plants. Apart from its use in prolonging the life of cut flowers and preventing dehydration during transport, it is claimed that this plastic coating will minimize the shock received by plants at transplanting, and will increase survival rates. Addition of the material to solutions of 2,4-D and certain insecticides and fungicides is said to increase the range and effectiveness of the spray.

2328. JEFFERSON, R. N., AND PENCE, R. J.

Preliminary experiments on the control of the leaf miner *Liriomyza flaveola*, on asters.
J. econ. Ent., 1948, **41**: 653-5, bibl. 2.

Serious losses of field-grown asters have recently been caused by leaf miner in the Los Angeles area. Satisfactory control has not been obtained by nicotine or DDT. Experiments carried out by the University of California, Los Angeles, show that chlordan sprays containing from 1.0 to 2.25 lb. chlordan per 100 gal., and a benzene hexachloride dust containing 0.75% gamma isomer, applied at the rate of 1.13 lb. of the gamma isomer per acre, will give good control.

2329. VILLAMIL, F. G.

A bud variation in Bougainvillea.

J. Hered., 1949, **40**: 69-70, illus.

A bud variation with variegated leaves and pale pink shoots was found in Colombia, S.A.

2330. P., G. C.

Carnations in gravel culture.

Grower, 1949, **31**: 396-8, illus.

The construction and mechanism of a gravel culture installation in a Worthing nursery is described. In a small-scale trial comparing the yield of carnation crops grown on soil, sand and gravel, over 50% more blooms per plant were cut from gravel culture than from soil beds.

2331. BEACH, G., AND MUSSEN BROCK, A.

Effect of nitrogen and potash fertilizers on Patrician carnations in soil.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 487-9.

In trials at Ft. Collins, Colo., plots with the highest nitrogen test for the season gave a higher yield and longer-stemmed flower than did any of four lower levels of nitrogen. The experiment is being repeated using heavier fertilizer applications in an attempt to find a damagingly high rate of nitrogen where a comparison can be made of the effect of relatively high potash upon excess nitrogen.

2332. POLLARD, S.
Bacterial wilt of carnations.
Grower, 1949, **31**: 1001.

Following a recent visit to America, the writer warns growers of the risk of introducing bacterial wilt of carnations into Britain in imported nursery stock.

2333. BEHRENS, G.
Blüten- und Gestaltsbildung bei *Chrysanthemum* und *Sempervivum* unter photoperiodischen Einflüssen. (The effect of photoperiodic treatment on flowering and structure in *Chrysanthemum* and *Sempervivum*.) [English summary 10 ll.]
Biol. Zbl., 1949, **68**: 1-32, bibl. 32.

As in *Kalanchoë*, foliage development by inflorescences and transformation of vegetative organs can be brought about in *Chrysanthemum* and *Sempervivum* as a result of photoperiodic treatment. The active agents responsible for these processes may affect parts of the plant not exposed to treatment. An examination of the susceptible age and of the response, under varying conditions, of both vegetative and reproductive organs, and lastly the transmission of flowering hormone from older to younger plants, suggest that in *Sempervivum* flowering maturity (Klebs' Blühreife) is an irreversible state. It sets in after vegetative propagation, occurring only in this phase and leading to flower formation in natural conditions. Prior to vegetative propagation independent plants of *Sempervivum* remain in the juvenile stage and do not flower, though they respond to differences in photoperiodic treatment. However, the addition of flowering hormones from flowering plants produces flower formation also in the juvenile stage. [Translation of the author's German summary.]—University of Göttingen.

2334. KIPLINGER, D. C., AND ALGER, J.
Interrupted shading of chrysanthemums.
Proc. Amer. Soc. hort. Sci., 1948, **52**: 478-80.

In trials at Wooster, Ohio, of several cultural treatments given to chrysanthemums to increase production and maintain high quality, the multiple pinch and interrupted shading methods appeared to be best. Of these two methods the interrupted shading is preferable because of the reduced labour required and the possibilities of greater production per square foot. This preliminary test showed that the length of the initial shading period is critical and must be determined for varieties which mature naturally at various dates as well as for year-around flowering of the chrysanthemum. Considering the interrupted shading method, it appears possible to produce a quantity of long-stemmed stock of high quality by increasing the period of long-day exposure between the first and second shading. For shorter-stemmed stock suitable for packaged flowers where high quality is necessary, this long-day

period can be reduced, resulting in a product ideally suited for this purpose. [Authors' summary.]

2335. GREEN, D. E., AND HEWLETT, M. A.
Die-back of cytisus cuttings.
J. roy. hort. Soc., 1949, **74**: 310-12, bibl. 4, illus.

A disease of cytisus cuttings, caused by an uncommon fungus, *Ceratophorum setosum*, is reported from the R.H.S. laboratories at Wisley. The prompt removal of affected parts and copper sprays are tentatively suggested as control measures.

2336. BARTON, L. V.
Storage and germination of delphinium seeds.
Reprinted from *Amer. Delphinium Soc. Year Book* 1946, **11**: 27-31 [received 1949].

Seeds of both annual and perennial delphinium were stored safely for 5 years when thoroughly air-dried and kept in sealed containers at temperatures of either 46° F. or 5° F. Annual seed was found to germinate very poorly at temperatures above 68° F. However, two weeks' pretreatment of the seed on moist filter paper at 50° F. resulted in a germination percentage of 51% and 41% at 77° and 86° F. respectively. Full data are presented.—Boyce Thompson Inst.

2337. MCELWEE, E. W.
The flowering response of the Veitch gardenia to long-day treatment.
Proc. Amer. Soc. hort. Sci., 1948, **52**: 475-7, bibl. 4.

By additional illumination it was found possible to advance the date of flowering in gardenia.

2338. POEL, L. W.
Germination and development of heather and the hydrogen ion concentration of the medium.
Nature, 1949, **163**: 647-8, bibl. 3.

"The optimal reaction for *Calluna* is in the region of pH 4."—University of St. Andrews.

2339. LANCASTER, S. P.
Some Indian hollyhock hybrids (*Althea rosea* × *Malva sylvestris*).
J. roy. hort. Soc., 1949, **74**: 262-4, illus.

A bigeneric crossing and backcrossing of the hollyhock, *Althaea rosea*, with an Indian plant of *Malva sylvestris* has resulted in fertile hybrids bearing clusters of 3 or more flowers in each axil, that open in succession. This character, together with a branching habit, will give a better display for a longer period than the normal hollyhock. Many promising variations of form and colour have been produced.—Royal Agr Horticultural Society of India.

2340. DUNHAM, C. W., AND ROBERTS, R. H.
Notes on growth habits and pinching of hydrangeas.
Proc. Amer. Soc. hort. Sci., 1948, **52**: 525-7.

Reasons are given for the success of the second pinch applied to hydrangea plants.

2341. COMPTON, C. C.
For control of soil insects: chlordane in fertilizer.
Agric. Chemts, 1949, **4**: 5: 29, 93.

In the author's view the stimulating effect of chlordane

on plant growth is due to soil pest control. Satisfactory distribution of the chemical in fertilizer has been obtained by the use of 5% and 10% dusts, 25% and 40% wettable powders or by atomizing an emulsion concentrate into the fertilizer. Tests with proprietary chlordane-fertilizer mixtures [not specified] are being continued. Applications to the surface of lawns should be made prior to rain or they should be watered in.

2342. BALÁS, G.

Összehasonlító vizsgálatok kontakt mérgekkel. (Comparative trials with contact insecticides.) [German summary $\frac{1}{2}$ p.] *Bull. Fac. Hort. Budapest*, 1948, 12: 92-9, bibl. 3.

The Hungarian insecticide Agri-Tox (heptachlor-methyl-cyclohexane) proved very successful against the larvae of *Agrotis ypsilon* in lawns.

2343. GREY, C. H.

Hardy orchids.

North. Gdnr., 1949, 3: 139-44, 175-8, illus.

Notes on the cultivation of many species of hardy orchids that may be grown readily in open woodland conditions or in a sunny limestone rock garden in this country. The list includes species from Siberia, China, Japan and the United States, as well as many of our native orchids.

2344. VACIN, E.

Changes in pH in orchid culture media.

Orchid Digest, 1949, 13: 301-5.

The reason for pH changes in orchid culture media during autoclaving, seed germination and seedling growth were investigated. It was found that amino acids are very satisfactory buffering agents. A culture medium of diluted tomato juice supplemented with sucrose is better buffered and results in a faster rate of germination than the traditional solutions containing inorganic salts and sugar. This is considered to be due to the organic nature of the medium, a theory that is borne out by the good results obtained from the use of 1% protein hydrolysate medium. The characteristic behaviour of protocorms grown on an organic medium is described.

2345. YATES, R. C., AND CURTIS, J. T.

The effect of sucrose and other factors on the shoot-root ratio of orchid seedlings.

Amer. J. Bot., 1949, 36: 390-6, bibl. 15, illus.

The shoot to root ratio in orchids is markedly affected by a variation in the sucrose content of the external medium. Each species exhibits distinct optima for shoot and root growth, the root optimum being consistently higher than the shoot optimum. Concentrations of sucrose which give the greatest root growth show a suppression of top growth. The effect caused by increasing the sugar concentrations is not due to relative decrease in mineral salt concentrations as a whole, or to decrease in nitrogen specifically. It is accompanied by an increase in the carbohydrate content of the plants. At low concentrations the increase is in sugars; at high concentrations starch is stored. Light is shown not to be necessary for root formation or elongation in *Oncidium*, but root and leaf formation are more extensive in the light. The seedlings of

different species vary distinctly as to their ability to grow in the dark, despite the fact that they are supplied with sugars and nutrients. Failure to develop in the dark is not due to unfavourable carbon dioxide or oxygen tensions. Manganese is shown to stimulate root growth at 50 p.p.m., but top growth is unaffected by concentrations up to 1,000 p.p.m. Low concentrations increase the chlorophyll content, while at high concentrations there is distinct chlorosis. Alpha-naphthalene acetamide is shown to stimulate top and root growth simultaneously. None of the concentrations tested are inhibitory. The suggestion is made that the shoot to root ratio is a direct response to the sugar concentration in the plant and that other factors which affect the ratio act through carbohydrate metabolism. [Authors' summary.]—University of Wisconsin, Madison.

2346. KORNILOV, A. A.

The flowering of perilla under continuous illumination. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 64: 401-3, bibl. 8, illus.

The work is reviewed of previous Russian workers on *Perilla ocymoides*, a typical short-day plant which is stated not to flower under continuous illumination. The author presents data to show that he obtained flowering in *Perilla* under continuous illumination but that the plants developed very slowly in comparison with those under normal illumination (8-9 hour days).

2347. WELLMAN, F. L.

Successful spray control of Alternaria blight of petunias grown for seed in Costa Rica.

Plant Dis. Repr., 1949, 32: 69-72.

Alternaria blight (*A. tenuis*) of petunias has been satisfactorily controlled by weekly sprayings of Fermate and Parzate with a resin spreader sticker.

2348. FLETCHER, H. R.

A new Tibetan primula, *Primula tayloriana*.

J. roy. hort. Soc., 1949, 74: 209-11, illus.

A botanical description of a beautiful species of the Section *Farinosae* which received the R.H.S. Award of Merit in March, 1949.

2349. PRESTON, G. H.

Some good plants suitable for the rock garden.

J. roy. hort. Soc., 1949, 74: 195-208, illus.

Deals with some plants which flourish at the Royal Botanic Gardens, Kew.

2350. TERRY, H. B.

Rose stocks and budding [in S. Africa].

Fmg S. Afr., 1949, 24: 188-9, illus.

In South Africa, the majority of rose varieties are budded on *Rosa multiflora*. Advice is given on: raising and preparing rootstocks, selecting budwood, when and how to bud.

2351. KAMP, J. R.

The incidence of blindness in the Better Times rose.

Proc. Amer. Soc. hort. Sci., 1948, 52: 490-500, bibl. 3.

Careful observations in the greenhouses of the University of Illinois on the results of shading and defoliation

on carbohydrate metabolism and blindness of the Better Times rose indicate that blindness is probably caused by a hormonal mechanism rather than a nitrogen-carbohydrate relationship.

2352. GALLE, F., AND CHADWICK, L. C.

The effect of mulches and companion crops on soil aggregation and porosity and on the growth of some woody ornamental plants in the garden and nursery.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 517-24, bibl. 7.

Species concerned in these trials at Columbus, Ohio, were roses, *Taxus cuspidata*, and several other shade trees.

2353. CULBERT, J. R., AND WILDE, E. I.

The effect of various amounts of potassium on the production and growth of Better Times roses under glass.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 528-36, bibl. 4.

The results of trials at State College, Penn., stress the necessity for using considerable amounts of potassium in the presence of adequate amounts of N and P.

2354. MCCLELLAN, W. D.

Botrytis on greenhouse roses.

Plant Dis. Repr., 1949, **33**: 137-8.

Botrytis cinerea was isolated from blighted young rose shoots and rotting rosebuds and inoculated into buds and shoots. Rotting of the inoculated buds and shoots was more severe at 65° and 75° than at 85° F. and the rot progressed farther in unwounded than in wounded tissue. The rot extended as much as 3½ in. below the buds and completely destroyed them.

2355. EIDE, P. M.

A tip-infesting sawfly on rose.

J. econ. Ent., 1948, **41**: 819-21, bibl. 2, illus.

A note on the life history and habits of this sawfly (*Ardis sulcata*) that has recently been observed for the first time in the United States. The insect is found on wild roses, and has caused great damage to Manetti rose stocks in Washington State. Damage to ornamental roses and other species grown for rootstocks is rare. No satisfactory control is known.—Bureau of Entomology and Plant Quarantine, U.S.D.A.

2356. MARCHIONATTO, J. B.

El "Tizon" o "Podredumbre del tallo" del conejito. (Leaf spot or stem rot of snapdragons [in Argentina].) [English summary.]

Rev. Fac. Agron. B. Aires, 1948, **12**: 3-7, bibl. 3, illus.

The cause of a leaf spot of antirrhinums observed in Argentina is identified as *Phyllosticta antirrhini*, a fungus little known there. Its behaviour in culture medium, and its pathogenicity to antirrhinum seedlings is investigated.

2357. ROSENSTIEL, R. G.

Laboratory effects of parathion on the two-spotted mite.

J. econ. Ent., 1948, **41**: 835-6.

Good control of the two-spotted mite on sweet peas

was obtained by parathion at a strength of 1 lb. 15% parathion per 100 gal. of spray.—Oregon State College, Corvallis.

2358. SMITH, K. M.

A new virus disease of *Tropaeolum* and other plants.

Gdnrs' Chron., 1949, **125**: 160, illus.

A previously undescribed virus disease has been observed on nasturtiums. The leaves of affected plants are crinkled and small, with necrotic spots and mottling; the flowers show a tendency to "colour break". The virus also attacks broad beans, peas and ridge cucumbers, and has been transmitted experimentally to a number of solanaceous plants. The insect vector is probably *Aphis fabae*.—Molteno Institute, Cambridge.

Shrubs.

(See also 1713, 1929.)

2359. TER PELWIJK, A. J.

Amelanchier-soorten in Nederland en hun betekenis voor tuin- en bosbouw. (Species of amelanchier in the Netherlands and their significance for horticulture and forestry.) [English summary 12 ll.]

Meded. Dir. Tuinb., 1949, **12**: 207-34, bibl. 54, illus.

The cultivated and wild species of amelanchier found in Holland are described and discussed under: (1) introduction (with a note on the Dutch popular name "krentenboompje"—currant bush), (2) history, (3) botanical affinities, (4) geographical distribution, (5) nomenclature, (6) descriptions of species (with a key for their identification and a table of their distinguishing characters), (7) significance in horticulture and forestry, and (8) propagation.

2360. ROBERTS, A. N., AND BOLLER, C. A.

Pollination requirements of English holly, *Ilex aquifolium*.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 501-9, bibl. 4.

For satisfactory berry set pollination trials at Corvallis, Oregon, show conclusively that the presence of a certain number of male trees is essential. In normal years it is suggested that one staminate to 50 berry bearing trees should suffice.

2361. BOWERS, C. G.

Distribution and classification of rhododendrons.

Brooklyn bot. Gdn Rec., 1949, **5**: 18-24, illus.

This popular article gives a brief account of the distribution of wild rhododendrons and azaleas, and the centres of cultivation. The groups of horticultural importance in the Eastern United States are provisionally classified, and the difficulties, due to natural hybridization, of any rigid classification are discussed.

2362. SEALY, J. R.

Species of *Sarcococca* cultivation.

J. roy. hort. Soc., 1949, **74**: 301-6, illus.

A classification and description of the species of *Sarcococca* (sweet box). One species which had hitherto been confused with two others is shown to be distinct, and is here called *S. confusa*.

Bulbs, tubers, etc.

(See also 1929, 2575, 2614.)

2363. MACLEAN, N. A.

Fire and rot of bulbs in Washington.

Abstr. in *N.W. Sci.*, 1948, 12, p. 17.

During the past year two species of fungi have been found occurring on unusual hosts in Washington State. *Rhizoctonia solani* caused severe top rot of tulip bulbs, and *Botrytis elliptica*, the common "fire" of lilies, attacked autumn crocus and gladiolus spp., causing spotting of old leaves and tipkilling of the young ones. This extended host range will necessitate a carefully planned rotation system in the bulb-growing industry.

2364. GOULD, C. J., AND MILLER, V. L.

A cheaper and safer treatment for controlling basal rot of narcissus bulbs.

Mim. Circ. W. Wash. Exp. Stat. 147, 1949, pp. 3.

GOULD, C. J.

A new fungicide for basal rot control.

Proc. Bulb Gr. short Course, Puyallup, March, 1949, pp. 63-6.

P.M.A. (phenyl mercuric acetate) is cheaper than Ceresan and much safer to use, but sometimes it has not given such good control as 2% Ceresan. A rate of 1 lb./700 gal. is recommended. Certain precautions necessary when applying it are discussed.

2365. LAWRENCE, W. J. C.

Genetic control of biochemical synthesis as exemplified by plant genetics.

Abstr. in *Biochem. J.*, 1949, 44: vi.

The article is an abstract of a paper read to the Biochemical Society in February, 1949, dealing chiefly with pigment production in dahlia flowers.

2366. MAGIE, R. O.

Problems in gladiolus production [in Florida].

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 197-9 [received 1949].

Over 10 million dozen spikes are produced annually for market in Florida, the variety Picardy and its sports comprising over 80% of the crop. A number of diseases and the control measures taken against them are mentioned. Brief reference is made to variety trials, plant breeding, future research, and air transport for cut flowers.

2367. NELSON, R.

Diseases of gladiolus.

Spec. Bull. Mich. agric. Exp. Stat. 350, 1948, pp. 63.

This bulletin describes diseases of gladiolus and their control under the following headings. (1) Diseases most active in the field. (a) Fungous diseases—*Fusarium* yellows; *Sclerotinia* dry rot; basal dry rot; *Septoria* leaf spot and corm rot; *Stemphylium* leaf blight (red spot); *Botrytis* leaf spot, stem and corm rot. (b) Bacterial diseases—scab; bacterial blight. (c) Virus diseases—type I, mild mosaic; type II, white-break mosaic. (2) Diseases of undetermined cause—ink spot. (3) Chemical injuries. (4) Diseases most

active in storage. (a) Fungous diseases—*Fusarium* dry rot (brown rot); *Penicillium* rot (blue mold). (b) Non-parasitic diseases—storage breakdown. (5) Soil management and control of soil-borne disease. (6) Fungicidal solutions and suspensions for corm treatments: standard corrosive sublimate; calomel and yellow oxide of mercury; new improved Ceresan, lysol. Fumigation of storage houses.

2368. MCCLELLAN, W. D., BAKER, K. F., AND GOULD, C. J.

Occurrence of the botrytis disease of gladiolus in the United States in relation to temperature and humidity.

Phytopathology, 1949, 39: 260-71, bibl. 19, illus.

Infection of the foliage of 3 varieties of gladiolus with *Botrytis gladiolorum* Timmermans under controlled temperature conditions was most severe at 55° and 65° F. The optimum temperature for infection of freshly harvested corms was 35° F. It is concluded that the regional prevalence of both the foliage phase and the corm rot phase of the disease in a given area can be predicted with the aid of weather records.

2369. COURTNEY, W. D.

Iris nematodes and their control.

Proc. 1949 Bulb Gr. short Course, Puyallup, March, 1949, pp. 25-31, bibl. 3.

The control suggested is treatment in the hot water bath at 110-111° F. for 3 hours, formaldehyde at the rate of 1 pint to 25 gallons of water being incorporated in the water. The bulbs should either be planted immediately after treatment or dried thoroughly in shallow trays placed in adequate air circulation.

2370. HASTINGS, R. J.

Sanitation vs. the bulb eelworm in field and shed.

Proc. 1949 Bulb Gr. short Course, Puyallup, March, 1949, pp. 32-44, bibl. 23.

The author, who is concerned chiefly with iris eelworm, discusses the attempts made to clarify the position with regard to the time and temperatures necessary for the hot water bath. He concludes that at present "there is no surer way of ensuring a good kill of eelworms by the hot water treatment than that of early harvesting and early treatment". Fumigation of bulbs is not satisfactory but soil fumigation is much more promising. Work on this is, however, necessary. Chemical dipping of bulbs also proves unsatisfactory owing to the difficulty of ensuring contact between the chemical and the pest. Hot water treatment remains the best.

2371. TISDALE, W. B., AND RUEHLE, G. D.

Pythium root rot of aroids and Easter lilies.

Phytopathology, 1949, 39: 167-70, illus.

The disease described and attributed to *Pythium splendens* has been seen in Chinese Evergreen (*Aglao-nema simplex* Blume), other aroids, and Easter lily in several localities of Florida. Root decay was extensive in all plants examined, and many roots were dead. Several of the new fungicides were tested in potted soil to ascertain whether they would eradicate the fungus from the soil without injuring the plants. Tersan (tetramethyl thiuram disulphide) and Fermate

were the only materials which showed promise—Florida Agricultural Experiments Stations, Gainesville and Homestead.

2372. USTINOVA, E. I.

The rhythm of development of the growing point in the Siberian squill (*Scilla sibirica* L.) during autumn and winter. [Russian.] *Doklady Akad. Nauk S.S.S.R.*, 1949, 64: 853-6, bibl. 7, illus.

A cytological study of the early stages of the development of the reproductive organs.

2373. VAN DER VEEN, R.

Wachstumsförderung von Tulpen mittels Kunstlicht. (The forcing of tulips in artificial light.) Reprinted from *Philips' tech. Rundschau*, 1949 (?), Vol. 10, H.9, in *Gärtnermeister*, 1949, 52: 169-71, bibl. 1.

A report is given of experiments carried out in Holland by J. W. M. Roodenburg, J. D. W. van Geel and C. Schoutens to test the practicability of forcing tulips in opaque, insulated buildings illuminated by artificial light. The results were most satisfactory and it was found that the expense for lighting was more than compensated by the saving in heating, even in the mild winter of 1947/48. A gladiolus drying shed was insulated by a 2.5 cm. thick wood fibre slab excluding all daylight, and in it a constant temperature of 22° C. was maintained by means of a stove and a fan. The forcing boxes were placed on a 110 cm.-wide table running alongside the length of the walls. Electric bulbs of 75 watts were installed 75 cm. above the upper surface of the boxes at distances of 75 cm. so that every square metre of the area to be illuminated received 90 watts. The light was turned on for a 9-hour period in every 24 hours. To obtain the maximum effect the ceiling and walls of the shed were whitewashed. In the first test (variety: Kfelage's Triumph) begun 18 December, flowering started within the exceptionally short time of 17 days. Moreover, the quality of the flowers thus forced was superior and the normal percentage of inferior blooms fell to 4%. Similarly encouraging results were obtained with the Bartigon variety. Variations of the duration and intensity of the light treatment showed that the initial arrangement seems to have been a very good guess. Further investigations with different light colours and with fluorescent tubes as a source of light are in progress.

2374. KASSANIS, B.

A necrotic disease of forced tulips caused by tobacco necrosis viruses. *Ann. appl. Biol.*, 1949, 36: 14-17, bibl. 8, illus.

Tobacco necrosis viruses proved to be the cause of severe necrotic disease found on forced tulips in three nurseries. From 20% to 50% of some varieties were infected; other varieties were apparently healthy. The symptoms are necrotic spots and streaks, with stunting and twisting, and small plants are soon killed. —Rothamsted Experimental Station, Harpenden, Herts.

Noted.

2375.

- a BOND, G.
Root nodules of bog myrtle or sweet gale (*Myrica gale* L.). *Nature*, 1949, 163: 730, bibl. 4.
- b DAME, —.
Beitrag zur Kenntnis der Cyclamenblüten-Fleckenkrankheit, verursacht durch *Botrytis cinerea*. (A cyclamen petal spot caused by *B. cinerea*.) *NachrBl. dtsh. PflSchDienst*, 1948, 2: 133, bibl. 1.
- c DOMOKOS, J.
További adatok a czerszömörce (*Cotinus coggygia* Scop.) elterjedéséhez és változékonyságához. (Distribution and variability of the smoke tree, *Cotinus coggygia*.) [German summary $\frac{1}{2}$ p.] *Bull. Fac. Hort. Budapest*, 1948, 12: 182-4, bibl. 7.
- d G.
Les semis des spores de fougères et soins aux jeunes plantules. (The propagation of ferns by spores and the raising of young ferns.) *Rev. hort. suisse*, 1949, 22: 177-9, illus.
- e GARRISON, R.
Origin and development of axillary buds: *Syringa vulgaris* L. *Amer. J. Bot.*, 1949, 36: 205-13, bibl. 26, illus.
- f GREEN, D. E., AND HEWLETT, M. A.
Two diseases of *Lachenalia glauca*. 1. A bulb rot caused by a species of *Fusarium*. 2. A leaf spot caused by *Mystrosporium adustum*. *J. roy. hort. Soc.*, 1949, 74: 211-15, bibl. 1, illus.
- g HANGER, F. E. W.
Notes on two *Camellia* species. *J. roy. hort. Soc.*, 1949, 74: 192-4, illus. Refers to *C. saluenensis* and *C. taliensis*, their history and culture.
- h JOHNSON, H. B.
The disease factor in easter lily bulb production in Florida. *Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947*, pp. 211-12 [received 1949].
- i LONGLEY, L. E.
New garden chrysanthemums. *Minn. Hort.*, 1949, 77: 23, being *Pap. misc. J. Ser. Minn. agric. Exp. Stat.* 651.
- j MEIER, W.
Düngversuche mit Geranien. (Manurial trials with geranium.) *Gärtnermeister*, 1949, 52: 43-5. Of 3 proprietary substances.
- k PRESTON, F. G.
The genus *Clethra*. *J. roy. hort. Soc.*, 1949, 74: 245-7, illus.

- I VAN RAALTE, D.
Bloemisterijcentra in Belgie. (Belgian floricultural centres.)
Meded. Dir. Tuinb., 1949, 12: 343-56, illus.
- m S., F. H.
Eine neue "Thurgovia"—*Primula malacoides*. (A new *P. malacoides*: Thurgovia-Hell [light].)
Gärtnernmeister, 1949, 52: 123-4.

- n STUART, N. W.
Results of the 1948/49 iris forcing experiments. A preliminary report on the effect of after-harvest and precooling temperatures on the forcing performance of wedgewood iris bulbs.
Proc. 1949 Bulb Gr. short Course, Puyallup, March, 1949, pp. 50-2.
Much promise but much still uncertain.

SUB-TROPICAL CROPS.

General.

(See also 1760.)

2376. RUEHLE, G. D.
Report of subtropical fruit committee.
Proc. Fla. St. hort. Soc. 60th annu. Meet., 1947, pp. 188-94, illus.
Includes illustrated descriptions of the following new varieties with notes on their origin. *Mango*: Strothman, Lippens, Florigon, and Keitt. *Avocado*: Hainz and Elliott.
2377. DESHPANDE, V. G., AND KARANDIKAR, K. R.
Insect pests of fruit and fruit trees in the Deccan.
J. Univ. Bombay, 1948, 15: 1-14. From *Brit. Abs.*, 1949, BIII, p. 116.
The following pests, and some control measures used against them, are mentioned: mango leaf hopper, stem borer (*Batrocera rubra*), stone weevil (*Cryptorhynchus mangiferae*), spring caterpillar (*Parasa lepida*), red ant (*Aecophyla smaragdina*), fruit flies (*Trypanidae*), orange fruit moth, lemon caterpillar (*Papilio demolius*), leaf miner (*Phyllocnistis citrella*), bark borer (*Arbela tetraonis*), white fly (*Aleurocanthus spinifera*), scale (*Chrysomphalus aonidum*), aphid (*Toxoptera aurantii*), grapevine beetle (*Scelodonta strigocollis*), grapevine girdler (*Sthenias grisator*), pomegranate butterfly (*Virachola isocrates*), palm beetle (*Oryctes rhinoceros*), palm weevil (*Rhynchophorus ferrugineus*), coconut leaf caterpillar (*Nephantis serinopa*).

Citrus.

(See also 2086, 2087, 2139, 2574, 2603, 2620, 2630, 2633.)

2378. LOMBARD, T. A., AND ANDERSON, D. S. C.
Report of the California Citrus Research Committee.
Calif. Citrogr., 1948, 33: 466, 483-4.
Includes an account of the organization, direction and administration of the University of California citrus research work, research progress during the past year, and some current problems deserving special attention.
2379. RUTHERFORD, D. M.
Report from Zebediela.
Calif. Citrogr., 1948, 33: 518, 554-6, illus.
A short description of some methods used on the Zebediela estates, South Africa, where 6,000 acres of oranges are grown, about half navels and half valencias. Particular attention is paid to the economical use of irrigation water.

2380. GUZZINI, D.
Il Sanguinello Moscato di Santa Maria in Licodia. (The blood orange variety Sanguinello Moscato.)
Ital. agric., 1949, 86: 361-6.
An account of the origin and characteristics of this highly prized blood orange of Sicily and a plea for its exact definition and standardization for export purposes.
2381. AGNEW, G. W. J.
Citrus bud selection in Queensland.
Qd agric. J., 1949, 68: 154-6.
A short, popular article on the occurrence of bud sports, followed by notes on budwood selection, pedigree budwood-plots, and the citrus budwood scheme organized by the Department of Agriculture. Since 1934 about 1½ million citrus buds have been supplied by the Department for commercial use, of which about half were from oranges (Washington [=Bahia] Navel, Joppa, and Valencia Late), the remainder being mandarins (Ellendale Beauty, Beauty of Glen Retreat, and Emperor of Canton), lemons (Villa Franca and Lisbon), and Grapefruit (Marsh's Seedless). Seed of bush lemon, sweet orange, and Emperor of Canton mandarin is supplied by the Department for raising rootstocks. The Beauty of Glen Retreat mandarin appeared near Brisbane in 1873 as a chance seedling, while Ellendale Beauty arose in the Howard district in the same way about the end of the century.
2382. SWINGLE, W. T.
Nucellar bud seedlings.
Calif. Citrogr., 1948, 34: 54, 66-7, bibl. 12.
Some notes on: the discovery by Strasburger in 1878 of asexual nucellar seedlings in citrus, their value as a source of virus-free planting material, their slowness in coming into bearing, their superior vigour and their supposed resistance to cold, etc. It is impossible to recognize nucellar seedlings with certainty, unless the pollen parent of the true seedlings present has some outstanding characteristic, e.g. the trifoliate leaves of *Poncirus trifoliata*, the hybrids from which show this character. The navel mark seen on navel oranges is stated to be of virus origin.
2383. CAMERON, J. W.
The behavior of some nucellar seedling lines in citrus.
Calif. Citrogr., 1948, 33: 333, 367-8, illus.
This article is mainly a summary of some findings of H. B. Frost working in California. Tables are reproduced showing comparisons of tree size of old and young (nucellar seedling) lines in citrus, and the

performance of the parent and nucellar seedling lines of the Satsuma mandarin. The data discussed are based on a few trees only. Further, the comparisons made are with the old parent lines only and not with selected, vigorous strains of the same variety. Although some nucellar seedlings show distinct promise, all should be subjected to extensive trial before recommending them for propagation. Very undesirable variations (e.g. lack of juice) have been observed in some.

2384. JOHNSTON, J. C.

Selecting citrus nursery trees.

Calif. Citrogr., 1948, 33: 392-4, 396.

Gives advice on the choice of suitable rootstocks and budwood in California. Some characteristics of the following stocks are given: sweet, sour, and trifoliate oranges, grapefruit, rough lemon, Sampson tangelo, and mandarin.

2385. BITTERS, W. P.

Foliage and bud union characters of rootstocks for oranges.

Calif. Citrogr., 1948, 33: 378-9, bibl. 4, illus.

The accurate identification of citrus rootstocks is difficult. While the chemical method of identification is generally reliable for distinguishing between sweet and sour orange stocks, it is less reliable when used for others. Studies of the bud union and of the foliage growing on suckers arising from below the bud union are valuable aids in determining a rootstock's identity. This information may be used to supplement the chemical test. The author briefly reviews the differences in foliage characters of the various species commonly used as rootstocks in California and describes the character of the bud union usually found when these are budded to Valencia or Washington navel oranges. The leaves described are those of sweet, sour, and trifoliate oranges, grapefruit and shaddock, mandarin, and rough lemon. Photographs illustrate under- and over-growth of stocks and smooth unions.

2386. MARLOTH, R. H.

Sweet orange as a rootstock for citrus.

Fmg S. Afr., 1949, 24: 216-20, 261-5, bibl. 18, illus.

An article for growers on some of the comprehensive and extensive rootstock trials laid down in South Africa following Webber's visit of 1925. Modern methods of horticultural experimentation were used throughout and data in most cases were subjected to statistical analysis. The article deals only with the data from Valencia oranges on sweet orange or rough lemon rootstocks. The author first briefly refers to the experimental methods used and then discusses yields and fruit quality at some length. The yield data are tabulated. The second part of the article deals with the factors involved in choosing between sweet orange and rough lemon stocks and weighs the *pros* and *cons* of each. Among the advantages claimed for rough lemon are: it shows a lower proportion of inherently weak and off-type stocks; it is easy to raise, bud, and transplant; it is most suitable for very light, sandy soils; tree-growth on it in the first 5 years is more rapid than on sweet orange; trees on it bear early and outyield trees on sweet orange for the first

7 years; it is more resistant to "brown rot gummosis"; fruit borne on young trees are larger than those on sweet orange; the acidity of fruit on it is slightly lower than in fruit from sweet orange stocks. Against these advantages it is stated that: the quality of fruit from it in the early years is very poor in some districts, and even at maturity its quality is lower than that of fruit from sweet orange stocks, since it has a coarser and thicker rind, a lower juice content, less soluble solids in the juice and often a lower ratio of soluble solids to acid. Again, its fruit tends not to hang so well after maturity, its trees decline considerably in yield and health after 25-30 years and are susceptible to "dry root rot". The following advantages over rough lemon are claimed for sweet orange stock: the quality of the first fruit on it complies with marketing regulations, and the fruit has a higher quality throughout the life of the tree; fruit tends to hang longer after maturity; it is better suited to medium and heavy soils and has, apparently, greater resistance to "dry root rot"; trees on it have a longer productive life and their decline sets in later. The disadvantages of sweet orange stocks compared with rough lemon are: trees budded on it are more difficult, and slower, to propagate; the greatest care is necessary when planting them out; initial growth of trees on it is less for the first 5 years; trees produce less during the first 7 years of bearing and are more susceptible to "brown rot gummosis". For many growers in South Africa the decision whether to use rough lemon or sweet orange will depend on whether quantity or quality of fruit is the more important consideration.

2387. OPITZ, K. W.

Trifoliate orange rootstock in Tulare County [California].

Calif. Citrogr., 1949, 34: 300-2, illus.

Despite some unfavourable results from the use of *Poncirus trifoliata* rootstocks for oranges there is abundant evidence to support the belief that carefully selected strains of the trifoliate orange may prove one of the best rootstocks for many growers. Uniform, moderate to vigorous growing strains may be expected to yield good crops of above average-sized fruit of outstanding quality. Earlier fruit from Washington Navel trees on trifoliate root is an important consideration. [From author's summary.]

2388. HAAS, A. R. C.

Blossom opening and orange production.

Calif. Citrogr., 1948, 34: 57, 72-3, bibl. 4, illus.

A summary of a study of the relationship of time of flower opening to fruit production in orange trees in southern California. A more complete report is to be published elsewhere. Contrary to expectation, the first blossoms of Washington navel and Valencia oranges to open had the poorest chance of developing into mature fruit, or no chance at all. Fruit-set steadily increased as the flowering season, extending over approximately 2 months, progressed. For this reason blossom-thinning, to improve fruit quality or to regulate the bearing habit, requires a knowledge of the relationship of the different flowering dates to crop production. The fact that the various fruit on an orange tree may differ by a month or more in age may explain, in part, observed differences in fruit quality.

2389. WINSTON, J. R.

Vitamin C content and juice quality of exposed and shaded citrus fruits.*Proc. Fla. St. hort. Soc.* 60th annu. Meet. 1947, pp. 63-7, bibl. 10.

In these investigations vitamin C content was found to be significantly higher in fruit from outside branches than in those from inside branches of the same tree. Percentage of total soluble solids was significantly higher in the exposed fruit of all varieties tested. Total acid averaged somewhat higher in the outside Temple fruit than in that from the inside branches, while Dancy tangerines showed the reverse difference. Round oranges, including early, mid-season, and late varieties showed no significant difference in total acidity between fruit collected from inside and outside branches. [From author's summary.]

2390. NOTTAGE, I. L.

The pruning of citrus trees.*N.Z. J. Agric.*, 1949, 78: 375-83, bibl. 3, illus.

Principles underlying citrus pruning in New Zealand are: 1. prune regularly and lightly, interfering with the natural habits of growth as little as possible; 2. encourage good growth by judicious thinning or shortening the less desirably placed branches; 3. keep the lower branches of bearing trees reasonably clear of the ground, remembering that they carry much of the crop where it is easily picked; 4. shorten excessively long side or top branches; 5. thin out weak or spent fruiting wood, especially from lemon trees, which require more pruning than do other citrus; 6. cut out all diseased or dead limbs; 7. do not cut out healthy branches carrying good foliage unless there is very good reason for doing so.

2391. HUGO, D.

Fertilizing and manuring of citrus trees in Natal [S. Africa].*Citrus Gr.* 1949, No. 181, pp. 7-8, bibl. 3.

Suggestions are made for applying N, P, K, and animal manure, based on past observations and the experimental data at present available.

2392. HAAS, A. R. C.

Experimental application of urea to lemon leaves.*Calif. Citrogr.*, 1949, 34: 286, 318, bibl. 3, illus.

A popular account of some experiments in which lemon cuttings, growing under N-deficient conditions, recovered their green colour and showed new growth after their leaves had been sprayed with a strong aqueous solution of urea, to which lime had been added.

2393. HAAS, A. R. C.

Symptoms of low potassium in leaves of citrus orchards.*Calif. Citrogr.*, 1948, 33: 520, 530, 532, 534-5, bibl. 5, illus.

Leaf analysis and soil survey in citrus orchards have previously offered no evidence of a lack of potassium in Californian citrus soils and no certainty has existed in regard to the interpretation of potassium analyses when the values fell between 0.2% (deficiency) and

1.0% (ample). In this study, citrus leaves with certain patterns found in orchards were shown to have a relatively low potassium content. The diagnostic value of these symptom patterns is that others have been instructed regarding them and have been able to collect similarly affected leaves also having a low potassium content. When the potassium content of the leaves is low, the calcium and magnesium content may be high. In some areas only the magnesium values rise, while in others the rise in either the calcium or magnesium values is negligible. Since the potassium content of citrus leaves decreases as maturity and old age are approached, maintenance of an ample supply of potassium in the leaves may be a possible means of delaying senility in the leaves. [From author's summary.]

2394. VANSELOW, A. P., AND DATTA, N. P.

Molybdenum deficiency of the citrus plant.*Soil Sci.*, 1949, 67: 363-75, bibl. 13, illus.

Rooted lemon cuttings grown in cultures deprived of molybdenum developed mottling and necrosis of leaves when the Mo originally in the cuttings had been attenuated by transfer to, and utilization by, the new growth. Cultures receiving Mo did not develop these symptoms. Mo-deficiency symptoms of the plants were quickly eliminated by the addition of 0.01 p.p.m. of Mo to the culture solutions. Even with additions of 0.0001 p.p.m., the plants recovered in a few months. The deficiency was also easily and quickly overcome by spraying small amounts of a soluble Mo compound on the foliage; spraying only a small portion of the foliage resulted in recovery of the entire plant.—University of California Citrus Experiment Station.

2395. CURTIS, D. S.

Effect of oxygen supply in nutrient solution on avocado and citrus seedlings.*Soil Sci.*, 1949, 67: 253-60, bibl. 9.

Avocado and citrus seedlings were treated in nutrient solutions containing oxygen concentrations ranging from 0.05 to 32 p.p.m. The root tips showed injury due to oxygen deficiency when the supply of dissolved oxygen was lowered to 0.7 p.p.m. or less. Avocado root tips failed to grow during exposure to low oxygen supply. Citrus roots continued to grow at all oxygen levels, but growth was very slow at the lowest concentrations.

2396. MARTIN, J. P.

Growth of citrus seedlings in old citrus soils.*Calif. Citrogr.*, 1949, 34: 102, 110-11, bibl. 5, illus.

A report on greenhouse studies. Sour and sweet orange seedlings made approximately 50% to 175% more growth in soils from areas which had never been cropped to citrus than in old citrus soil. Seedlings in old soil did not respond to soil applications of phosphorus, potassium, magnesium, copper, boron, zinc, or manganese. Soil fumigation prior to planting stimulated growth but did not increase it to a point comparable with that in non-citrus soil. It appears that detrimental soil micro-organisms are partly responsible for reduced growth of a second or third planting of trees in old citrus orchards. Other factors, however, may also be involved. [From author's summary.]

2397. JOHNSTON, J. C.

Irrigation in alternate middles as applied to citrus trees.

Calif. Citrogr., 1949, 34: 285.

The conditions under which this practice can be adopted with advantage are set out. For orchards on deep, permeable soil and with ample water supply there is no reason to use this method.

2398. BATCHELOR, L. D.

The problem of small size oranges.

Calif. Citrogr., 1948, 33: 469, 508-11.

A report on research at the University of California Citrus Experiment Station into this problem which appears to be associated with the advanced age of many of the orchards most seriously affected. So far results from research have been disappointing.

2399. STEWART, W. S., AND HEILD, H. Z.

Sprays to increase fruit size [of oranges and grapefruit].

Calif. Citrogr., 1949, 34: 284, illus.

"On the basis of 17 experiments performed since May, 1946, it appears that a single 2,4-D spray applied any time from several weeks before flowering to 3-4 months afterwards can increase the fruit size of the coming year's crop. Spraying with 2,4-D during this period not only increased fruit size but lengthened the growing period (hence delayed maturity) and reduced the number of fruits. Further tests with 2,4-D are necessary before any recommendations for its commercial use to increase fruit size are justified."

2400. STEWART, W. S., AND PARKER, E. R.

Sprays to reduce fruit drop from grapefruit trees.

Calif. Citrogr., 1948, 33: 332, 351-3, bibl. 4, illus.

A progress report on the use of 2,4-D in Californian trials. Applications in 1946-47 of water sprays containing 8 p.p.m. of 2,4-D effectively reduced the preharvest drop of mature grapefruit when applied at dates ranging from 15 April to just before harvest. In addition, the 1946 experiments indicated that sprays which were applied before the "June drop" was completed increased production by apparently reducing drop of immature fruit which occurs at that time. It is not definitely known whether such a reduction of June drop will be generally beneficial or harmful. Moreover, possible cumulative effects of 2,4-D applications, which may be made at any season, have not yet been established. A longer period of testing is necessary to determine these effects. [From authors' conclusion.]

2401. STEWART, W. S.

Effect of plant growth regulators on stored citrus fruit.

Calif. Citrogr., 1948 34: 58, 80-4, bibl. 9, illus.

Experimental results are quoted which indicate that citrus fruit from trees given a preharvest spray of 2,4-D or 2,4,5-T develop less "black buttons and Alternaria decay in storage than fruit from untreated trees. Fruit from trees sprayed with 2,4,5-T was markedly better in this respect than fruit from trees sprayed with 2,4-D." Tests of both substances

applied to citrus fruit in the packing house are under way.

2402. KLOTZ, L. J., AND STEWART, W. S.

Observations on the effect of 2,4-D on fruit-stem die-back in citrus.

Calif. Citrogr., 1948, 33: 425, bibl. 1, illus.

The results of 1947 trials are tabulated which show an important reduction in the amount of die-back observed in 3 kinds of citrus 1-3 months after applying 2,4-D. The reduction of fruit-stem die-back appears to be an extra benefit resulting from the application of 2,4-D for fruit drop control.

2403. STEWART, W. S., AND RIEHL, L. A.

Addition of 2,4-D to oil sprays [for citrus trees].

Calif. Citrogr., 1948, 33: 456-8, bibl. 1.

A report on the results of experiments in California, with suggestions for the use of 2,4-D in oil sprays, the addition of which is said to reduce: fruit-drop, mature leaf-drop, fruit stem die-back, and black buttons in stored fruits. The type of oil spray mixture should govern the type of 2,4-D used. If an ester is used, it is suggested that the concentration should be 250 p.p.m. of the free acid equivalent of 2,4-D in terms of the oil, or 4 p.p.m. in terms of the total volume of spray. This is as effective as 8 p.p.m. of a salt form of 2,4-D. The application of 2,4-D should be avoided from a month before to a month after blooming. Its application in oil even at the low concentration of 4 p.p.m. in the finished oil spray mixture may cause leaf curling when applied on young, actively growing shoots. Data so far obtained indicate no decrease in fruit quality or yield as a result of this curl, which may be minimized by applying the 2,4-D between leaf growth flushes. There is no information on the effect of 2 applications of 2,4-D per year.

2404. JOHNSTON, J. C.

Frozen [citrus] fruit: effect of delayed harvest on yield.

Calif. Citrogr., 1949, 34: 238.

An abstract from an article published in 1939 reporting a field study undertaken to answer the question of whether frozen oranges should be picked or allowed to remain on the trees seeing that they have no salvage value. The tabulated results indicate that the crop in any year influences the following crop and that the length of time the crop remains on the trees is a factor determining yields in the following year. No recommendations are made.

2405. JOHNSTON, J. C.

Treatment of frost-injured citrus trees [in California].

Calif. Citrogr., 1949, 34: 190, 210-11.

A summary of what to do and what to avoid in treating citrus trees which have been damaged by frost. Serious freezes occur in California at approximately 10-year intervals.

2406. KEPNER, R. A.

Operation of orchard heaters.

Bull. Calif. agric. Exp. Stat. 643, 1940, pp. 32, illus. [received 1949].

Information on the care and operation of several kinds of orchard heater in common use in America was

obtained as a result of field studies at the Citrus Experiment Station, Riverside. Practices are suggested by means of which smoke output may be minimized, and difficulties of oil residue overcome. The relative advantages of coke and oil heaters are discussed. [The heating efficiency of the different types of heater is not dealt with.]

2407. NEWCOMB, D. A.

Operating orchard heaters under present cost conditions.

Calif. Citogr., 1949, 34: 100, 136.

A discussion of the problem as it concerns citrus orchards in Corona, California. Figures are quoted to illustrate some factors involved in heating specified orchards. "With nearly a dollar's worth of oil in each stove it may sometimes pay to ask oneself the question, which shall I save, the fruit or the oil?"

2408. HOEGER, H. A.

Experiences with wind machines [in California].

Calif. Citogr., 1949, 34: 306-7, illus.

An account is given of observations made during the winter of 1949 in a 10-acre lemon orchard in the middle of which a dual engine wind machine, revolving through 360°, had been installed. The conditions under which the tests were carried out are described and a comparison made between the cost of using heaters alone and the cost of using heaters plus a wind machine. It is concluded that for complete protection in this area a wind machine does not eliminate the necessity for a full installation of heaters. The high initial investment of a wind machine requires the utmost efficiency per installation, to make it an economically sound investment in places which do not require a high average number of hours per year of protection. For fullest efficiency a thorough investigation should first be made of the effect of any wind drift.

2409. FAWCETT, H. S.

Citrus diseases in the Lower Rio Grande Valley [Texas].

Calif. Citogr., 1948, 33: 362-3.

A summary of a report on a visit in March, 1948, with special reference to psorosis, also known as California scaly bark. This disease has 6 forms in California, 4 of which were found in Lower Texas, i.e. psorosis A and B, concave gum psorosis, and blind pocket psorosis. Some symptoms are described. A scheme for the registration of trees free from psorosis is suggested. The occurrence of numerous sports in grapefruit is mentioned.

2410. SCURTI, J.

Sulla oleocellosi delle arance e sulle modificazioni istologiche che la caratterizzano. (Oleocellosis of oranges and the histological changes by which it is characterized.) [English summary 12 ll.] *Ann. Sper. agrar.*, 1949, 3: 179-93, bibl. 15, illus.

A skin disease of orange is described. Unlike "Fetola" [see *H.A.*, 9: 977; 10: 206, 1419], which is probably caused by insect (*Empoasca*) punctures, oleocellosis is due to the liberation of oil from the oil glands and the consequent corrosion of the cuticle.

This corrosion disorganizes the structure of the cuticle and dissolves the wax molecules. Corrosion is then followed by dehydration, which causes depression, contraction and degeneration of the cytoplasm.—Oss. Fitopat. Turin.

2411. RUGGIERI, G.

L'attuale problema del mal secco degli agrumi nelle sue immediate finalità pratiche. (Practical aspects of the control of mal secco in citrus.) [English summary 10 ll.]

Ann. Sper. agrar., 1949, Suppl. Vol. 3, No. 1, pp. xxv-xxxii.

In 20 years mal secco has spread widely in Italian citrus groves. The author suggests the adoption of definite hygienic and cultural measures to prevent its further spread, and urges the necessity for enforcing such measures by government control.—Acireale.

2412. GOIDANICH, G., AND RUGGIERI, G.

Effetti del freddo e "mal secco" negli agrumeti siciliani. (The action of low temperatures and the mal secco disease in Sicilian citrus groves.)

Ann. Sper. agrar., 1949, 3: 391-7, bibl. 2.

Observations on mal secco disease in Sicilian citrus groves have shown that low temperatures may be a predisposing factor for *Deuterophoma tracheiphila*, but they are not necessary for the establishment of the parasite. [From authors' summary.]

2413. BALDACCI, E., AND GAROFALO, F.

Disseccamenti dei rami di mandarino (*Citrus nobilis* var. *deliciosa*) dovuti a *Bakerophoma tracheiphila*. (Withering of mandarin branches due to *Bakerophoma tracheiphila*.)

Ric. sci., 1948, 18: 625. (Abstr. in *Rev. appl. Mycol.*, 1949, 28: 214.)

The occurrence of mal secco (*Bakerophoma* [*Deuterophoma*] *tracheiphila*) on 25-year-old mandarin trees is reported from Conca d'Oro, near Palermo, Sicily. The symptoms of the disease were similar to those on adjacent heavily infested lemon trees, but much milder. Chlorosis of the leaves was followed by withering of the twigs from the tips downwards and defoliation. The slowness of the pathological process in the mandarins constituted the main difference between this species and lemon. There was an appreciable decrease in the yield of the diseased mandarins.

2414. HWANG, L.

Spraying experiments to control citrus canker.

Phytopathology, 1949, 3: 177-81, bibl. 6.

Thorough spraying with bordeaux mixture or with bordeaux-oil emulsion during the growing season not only protected citrus foliage from infection but greatly reduced the amount of infection where already established. In a single season bordeaux-oil emulsion effectively controlled citrus canker in sour orange seedling stocks, but it failed to control the disease in stocks of the very susceptible Sunki and Mou-yu seedlings.—National Kwangsi University, Kwei-lin, China.

2415. ANON.

Septoria spot of citrus fruit.*Agric. Gaz. N.S.W.*, 1949, **60**: 85-7, illus.

The symptoms of Septoria spot of citrus fruit, caused by *S. depressa*, are described and illustrated. The recommended spray is bordeaux mixture $2\frac{1}{2}$ - $2\frac{1}{2}$ -100 plus $\frac{1}{2}$ gal. white oil. A single application in mid-March will give full control. This spray may be combined with a zinc spray for the control of mottle leaf: zinc sulphate 5 lb., copper sulphate 1 lb., hydrated lime 4 lb., water 100 gal., plus $\frac{1}{2}\%$ white oil.

2416. D'OLIVERA, B.

Uma podridão nova em frutos de citrus.

(A new rot of citrus fruits.)

An. Inst. sup. Agron. Lisboa, 1943, **14**: 265-70, bibl. 8, illus.

A rot seen on lemons on sale in Lisbon was found to be caused by *Phoma conidiogena* Schnegg, a fungus which produces not only pycnidia but also conidia of the *Alternaria* type. Inoculations on lemons, oranges and tangerines, through wounds in the skin, reproduced the disease.

2417. ROSSETTI, V.

Estudos sobre a "Gomose de Phytophthora" dos citrus—1—Suscetibilidade de diversas espécies cítricas a algumas espécies de "Phytophthora". (Studies on *Phytophthora gummosis* of citrus. 1. Susceptibility of various species of citrus to some species of *Phytophthora*.) [English summary 1 $\frac{1}{2}$ pp.]

Arg. Inst. biol. S. Paulo, 1947-48, **18**: 97-124, bibl. 15, illus.

A wide range of citrus species was tested at the Estação Experimental de Citricultura de Limeira in an attempt to find a rootstock resistant to foot rot (*Phytophthora* spp.) that could replace *Citrus aurantium* as a stock for sweet orange. The susceptibility of this combination to tristeza makes it impracticable in São Paulo, Brazil. Preliminary trials with many citrus species showed *C. sinensis* to be fairly resistant to foot rot. In further trials with 28 varieties of this species, the varieties Natal and Pera were singled out as being highly resistant to the fungus and possessing good rootstock qualities. They are both vigorous and the seeds germinate readily. A new type of bark borer used for inoculation of the trees with fungus culture is described and illustrated.

2418. SUIT, R. F.

Spreading decline of citrus in Florida.*Proc. Fla. St. hort. Soc. 60th annu. Meet.* 1947, pp. 17-23, bibl. 10.

Spreading decline has been increasing during the past 10 to 15 years and is now third in importance as a cause of decline in orchards. It occurs on grapefruit, oranges, and tangerines budded on rough lemon, grapefruit, or sour orange rootstocks. The spreading decline is apparently not caused by a fungus or a virus disease but appears to be the result of the infestation of the rootlets by the nematode, *Tylenchulus semi-penetrans* (Cobb). No control of spreading decline was obtained by different forms of pruning, tree injection with various chemicals in solution, or by soil

treatments with copper sulphate, sulphur, ammonium sulphate, sodium chloride, aluminium sulphate, hydrated lime, or Dithane. The nematode was controlled by D-D at the rate of 2, 3, 4 and 5 c.c. per sq. ft., but in practically all cases the trees were killed by this treatment, except when only half of the root area was treated with the 2 c.c. per sq. ft., when the trees merely lost considerable foliage. [From author's summary.]

2419. BENNETT, C. W., AND COSTA, A. S.

A preliminary report of work at Campinas, Brazil, on tristeza disease of citrus.*Proc. Fla. St. hort. Soc. 60th annu. Meet.* 1947, pp. 11-16, bibl. 1.

The evidence available seems to justify the conclusion that tristeza of citrus in Brazil is caused by a virus which can be transmitted from diseased to healthy plants by means of buds or twigs and by the black citrus aphid, *Aphis citricidus*. The virus probably is not juice-transmissible and as yet there is no conclusive evidence that it is transmissible through seeds of diseased plants. Probably the chief natural agent of transmission in Brazil is the black citrus aphid. Tristeza causes severe damage to all varieties of sweet orange, to mandarin, and to certain varieties of tangelo when these types are on sour orange stock. There is evidence also that it causes severe injury to sweet orange on grapefruit stock and to grapefruit on sour orange stock. In addition to these types of trees on which definite injury is produced, the virus occurs in certain kinds of citrus trees in which no symptoms have been detected. It has been recovered from an unidentified citrus seedling on its own roots, the "cravo" tangerine on its own roots, and from the Pera variety of sweet orange on Rangpur lime stock, none of which showed symptoms of the disease. These preliminary results indicate that the virus may be generally distributed in the various kinds of citrus trees in Brazil. [From authors' summary and conclusions.]

2420. BITANCOURT, A. A., AND FILHO, A. J. R.

Estudos sobre a "Tristeza" dos citrus.

1. Análise estatística da distribuição das árvores doentes de um pomar de laranja doce enxertada sobre laranja azeda. (A study of tristeza disease of citrus. 1. Statistical analyses of the distribution of diseased trees in an orchard of sweet orange budded on sour orange.) [English summary 1 p.]

Arg. Inst. biol. S. Paulo, 1947-48, **18**: 313-38, bibl. 17.

The spread of tristeza disease was plotted by recording the position of diseased trees in an orchard in November, 1942, October, 1943 and January, 1945. An analysis of the results supports the theory that tristeza is an infectious disease transmitted by a readily spread agent such as a micro-organism or winged insect vector.

2421. DICKSON, R. C., FLOCK, R. A., AND JOHNSON, M. M.

Insects in relation to orange tree quick decline: a progress report.*Calif. Citrogr.*, 1948, **34**: 88-9, illus.

Aphis citricidus (*A. tavaresi*), the vector of tristeza disease of citrus in S. America, is not known to occur in the U.S.A. In California a closely related species, *Toxoptera aurantiae*, has been suspected as being a carrier of quick decline which is "similar" to tristeza, but numerous transmission tests have failed to confirm this. Certain aspects of current investigations are discussed involving, to date, over 700 transmission tests with approximately 37,800 individual insects of more than 200 species.

2422. COTTIER, W.

Experiments on control of dicky rice weevil (*Maleuterpes spinipes* Blkb.) leaf rollers and the mealy-bug (*Pseudococcus longispinus* Targ.) on citrus.
N.Z. J. Sci. Tech., 1948, 29, Sec. A, pp. 276-86, bibl. 1, illus.

The conclusions drawn from trials carried out in 1945-46 and 1946-47 are: (1) DDT is very effective against both dicky rice weevil and leaf-roller. Two applications of a spray containing 0.05% p.p.i. DDT by weight, the first in the first week of December and the second in the first week of January, are sufficient. (2) A paint containing 5% p.p.i. DDT applied to trunks in the first week of December and again the first week of January controls weevil, but is inferior to a spray of 0.05% p.p.i. DDT applied at the same times. (3) DDT at 0.1% p.p.i. concentration or Gammexane at 0.006% gamma isomer content will not control the mealy bug.

2423. DEBACH, P.

Population studies of the long-tailed mealy-bug and its natural enemies on citrus trees in southern California, 1946.
Reprinted from *Ecology*, 1949, 30: 14-22, being *Pap. Univ. Calif. Citrus Exp. Stat.* 589.

Corrugated cardboard bands placed around the trunks of the trees and changed at monthly intervals were adequate for simultaneously sampling populations of the long-tailed mealybug, *Pseudococcus longispinus* (Targ.), and of its natural enemies, on citrus trees. Mealybugs increased rapidly during March, April and May, 1946, but were effectively controlled by natural enemies in June and July. DDT residues affected all the major predators involved for several months, but showed a selective action against parasites. Talc residues were detrimental to predator populations for a short time and resulted in rapid increase in mealybug populations.

2424. HEPBURN, G. A.

An attempt to control false codling moth by means of insecticidal sprays.
Citrus Gr. 1948-49, No. 179, pp. 2-5; No. 180, pp. 2-3.

An account is given of three experiments carried out during 1947-48 in the Sunday's River Valley, S. Africa, to determine whether false codling moth in citrus can be controlled by means of DDT and other sprays. The results show that DDT sprays are capable of reducing an infestation of this moth, but that the risk of causing a build-up of mealybugs or other pests must be considered. No spray recommendations are made.

2425. FLANDERS, S. E.

Biological control of yellow scale [*Aonidiella citrina*].

Calif. Citrogr., 1948, 34: 56, 76-7, bibl. 11.

This scale is a serious pest of citrus in central California. The history of the introduction of the pest and its parasites into California is traced. The biological control achieved in southern California is discussed in relation to the problem in central California.

2426. DEBACH, P., FLESCNER, C. A., AND DIETRICK, E. J.

Natural control of the California red scale on citrus.

Calif. Citrogr., 1948, 34: 6, 38-9, bibl. 4, illus.

A progress report on current Californian investigations into the possibility of controlling this scale [*Aonidiella aurantii*] biologically.

2427. GRIFFITHS, J. T., Jr., KING, J. R., AND THOMPSON, W. L.

Grasshopper (*Schistocerca americana*) control in citrus groves in Florida.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 80-6, bibl. 3.

Experiments concerning the use of benzene hexachloride, chlordane, thiophos 3422 and chlorinated camphene for grasshopper control are described. The effects of cultural practices and the possibility of control by judicious cultivation and cover-crop management is discussed. Recommendations for control are outlined. [From authors' summary.]

2428. THOMPSON, W. L., AND GRIFFITHS, J. T.

New insecticides and their application on citrus.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 86-90, bibl. 5.

The following insecticides, and the results obtained with them in trials, are briefly discussed: Thiophos 3422 or parathion (O,O-diethyl-O-p-nitrophenyl thiophosphate), K-1875 (Di(4-chlorophenoxy)methane), DDT, BHC, chlordane, chlorinated camphene, and HETP (Hexaethyl tetraphosphate).

2429. WOGLUM, R. S., PLUMMER, C. C., AND SHAW, J. G.

Insecticides for citrus blackfly (*Aleurocanthus woglumi*).

Calif. Citrogr., 1949, 34: 146, 177-80, bibl. 3, illus.

An account of Mexican experiments testing (1) cubé (derris) in light-medium emulsive oil, (2) the same plus DDT, (3) DDT in the same oil, (4) DDT in Mexican kerosene with blood albumen spreader and (5) parathion with spreader. Two months after application treatment (4) was the most effective, followed by parathion. Neither of these can be recommended to replace cubé root in oil, since DDT in kerosene injures citrus and parathion is toxic to man.

2430. KNORR, L. C.

Parasitism of citrus in Florida by various species of dodder, including *Cuscuta boldinghii* Urb., a species newly reported for the United States.

Phytopathology, 1949, 39: 411-12.

In Florida the author has observed 3 species of dodder on citrus and a near-citrus species: (1) *Cuscuta americana* L. on *Citrus sinensis* (L.) Osbeck (sweet orange), *Citrus paradisi* Macf. (grapefruit), *Citrus limon* (L.) Burm. (lemon), and *Citrus aurantifolia* (Christm.) Swingle (Tahiti lime); (2) *Cuscuta campestris* Yunck. on *Fortunella margarita* (Lour.) Swingle (Nagami kumquat); and (3) *Cuscuta boldinghii* Urb. on *Citrus sinensis*.

Avocado.

(See also 2395, 2574.)

2431. ANON.

New [yellow] avocado found in Dominican Republic.

For. Agric., 1949, 13: 119, illus.

A short note on a new, yellow-skinned variety, for which the name of Castillo is suggested after the town near which it appeared as a seedling. Its fruit is of medium size, smooth-skinned, and pear-shaped, similar to the Calavo. The flesh is excellent, of buttery consistency, with a nutty flavour when ripe. It may become popular because of its attractive appearance and quality.

2432. TEAGUE, C. P.

Avocados for replacing unproductive citrus trees?

Calif. Citrogr., 1949, 34: 145, 176, illus.

An examination of the possibilities in California where some citrus growers are attempting to solve the problems caused by quick decline of citrus by planting avocados.

2433. MACFARLANE, C. S.

Avocado blemish: a distal-end spot of avocado fruits [in South Africa].

Fmg S. Afr., 1949, 24: 205-6, illus.

The causative organism is *Pseudomonas syringae*, a bacterium which also attacks citrus fruits in S. Africa. This organism and the symptoms it produces are described. In the western Cape Province 4-4-50 bordeaux mixture has given satisfactory control, the first spray being applied to the fruit about 4 months before picking, the second and third sprays 3 and 6 weeks later.

2434. ZENTMYER, G. A.

Verticillium albo-atrum on avocado in California.

Plant Dis. Repr., 1949, 33: 42.

Verticillium albo-atrum was isolated in 1948 from avocado trees (*Persea americana*, *P. americana* v. *drymifolia*), showing severe wilting and "collapse". "This is apparently the first report of this fungus on a member of the family Lauraceae."—Citrus Experiment Station, Riverside.

2435. ZENTMYER, G. A.

Avocado wilt [in California].

Calif. Citrogr., 1949, 34: 316-17, bibl. 3, illus.

A description of the wilt caused by *Verticillium albo-atrum*, with notes on the varieties and areas affected and some suggested preventive measures.

Litchi.

2436. S[MITH], E. H. G.

The cultivation of the litchi.

Bull. imp. Inst. Lond., 1948, 46: 238-42, bibl. 9.

Notes on the requirements of the tree, its cultivation in China, South Africa and other countries, and the uses of its fruit.

2437. SHIGEURA, G.

Blossom-bud formation and fruit setting in the litchi.

Bien. Rep. Hawaii agric. Exp. Stat. 1946-48, 1948, pp. 138-40.

A short preliminary report on the study of unfruitfulness of the litchi in Hawaii showing that the vegetative maturity of the stem terminals has a definite bearing on blossoming during the following spring, and that SNA (sodium naphthalene acetate) sprayings, if done properly, cause maturation of these stem terminals.

2438. GROVE, W. R.

Wrapping [litchi] air-layers with rubber plastic.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 184-7, illus.

The various stages of the process of air-layering the litchi as carried out by the author are described and illustrated. A patent has been applied for to cover the method.

Papaw.

(See also 2623.)

2439. ADSUAR, J.

Studies on virus diseases of papaya (*Carica papaya*) in Puerto Rico.

I. Transmission of papaya mosaic.

Tech. Pap. P.R. Univ. agric. Exp. Sta. no. 1 [2+]¹⁰ pp., bibl. 14, illus. Rio Piedras, P.R., 1946.

II. Transmission of papaya mosaic by the green citrus aphid (*Aphis spiraecola* Patch).

Op. cit., no. 2, [1+]¹ 5 pp., bibl. 1.

III. Property studies of papaya mosaic virus.

Op. cit., no. 4, pp. [1+]¹ 7-11, bibl. 3.

from abstr. in Rev. appl. Ent., 1949, 37: 33.

Papaya, in Puerto Rico, is affected by three diseases, all thought to be due to viruses. They are bunchy-top, dieback, and mosaic. The mosaic virus was transmitted to healthy papaya by *Aphis spiraecola* Patch. An account is given of investigations on the physical properties of the mosaic virus.

2440. JENSEN, D. D.

Papaya virus diseases with special reference to papaya ringspot.

Phytopathology, 1949, 39: 191-209, bibl. 52, illus.

Previous work on papaya viruses in various countries is reviewed. Papaya ringspot virus, known only from the island of Oahu, Territory of Hawaii, causes a typical mosaic disease in papaya. The virus is carried by aphids and is mechanically transmissible. On the leaves it causes rugosity and mottling without marked distortion. Yellow spots and rings with green centres are produced on diseased fruits. Sixteen species of

plant, representing 12 families, were inoculated by means of infective aphids but all remained healthy.—University of Hawaii Agricultural Experiment Station, Honolulu, T.H.

2441. JENSEN, D. D.

Papaya ringspot virus and its insect vector relationships.

Phytopathology, 1949, 39: 212-20.

Myzus persicae (Sulzer), the most common insect on papaya in Hawaii, is the chief vector of ringspot virus. *Aphis gossypii* Glover, *A. medicaginis* Koch, and *A. rumicis* L. are also vectors, and probably *Macrosiphum solanifolii* (Ashm.) and *Micromyzus formosanus* (Tak.).

Sweet potato.

(See also 2456.)

2442. MINGES, P. A.

The nitrogen factor in sweet potato production in Iowa.

J. Sci. Iowa Coll., 1947, 22: 61-3 from *Soils Fert.*, 1949, Vol. 12, Abstr. 196.

The beneficial effect of NaNO_3 , $(\text{NH}_4)_2\text{SO}_4$, Uramon, calcium cyanamide and $\text{Ca}(\text{NO}_3)_2$ applied to a coarse sand of pH 4.6-5.5 was less in a dry year. Sweet potatoes are sensitive to the supply of nitrates in the soil, and applications of N in drought years were sometimes detrimental; in years of heavy spring rains, 25 lb./acre applied 3-4 weeks after planting may be followed by a second application with abnormally heavy summer rainfall. Barnyard manures were not as satisfactory as commercial fertilizers. NaNO_3 and $(\text{NH}_4)_2\text{SO}_4$ were satisfactory for either pre-planting or side-dressing applications, but the N in these forms was subject to leaching. Calcium cyanamide was satisfactory in wet years when applied 2 weeks before planting, but its toxic properties make it unsuitable for side dressing; it is injurious in dry years.

2443. JOHNSON, W. A., AND WARE, L. M.

Effects of rates of nitrogen on the relative yields of sweetpotato vines and roots.

Proc. Amer. Soc. hort. Sci., 1948, 52: 313-16, bibl. 2.

Observations at Auburn, Ala, on the effect of different applications of nitrogen on sweet potatoes gave but little evidence that conditions favouring vigorous vine growth result in smaller yields of roots. In most cases observed vine yields and root yields were significantly increased for each increase in nitrogen applied.

2444. MILLER, C. A., AND KIMBROUGH, W. D.

Effect of length of exposure to sun on keeping of sweet potatoes.

Proc. Amer. Soc. hort. Sci., 1948, 52: 322-4, bibl. 1.

An exposure of 3 hours at least was necessary to induce sun damage to Puerto Rico sweet potatoes lifted in August or September in Louisiana.

2445. DEWEY, D. H., AND BARGER, W. R.

The occurrence of bacterial soft rot on [sweet] potatoes resulting from washing in deep vats.

Proc. Amer. Soc. hort. Sci., 1948, 52: 325-30, bibl. 6.

Observations made in Kern County, California, show that submerging sweet potato tubers in water forced the entry of moisture and bacteria into the lenticels and favoured bacterial breakdown due to *Erwinia carotovora*.

2446. COCKERHAM, K. L., AND DEEN, O. T.

Insecticide tests in field plots for control of the sweetpotato weevil.

J. econ. Ent., 1948, 41: 563-5.

A report of experiments conducted in Louisiana to develop effective methods of controlling the sweet potato weevil (*Cylas formicarius elegantulus*). Best results were obtained by the application of calcium arsenate dust, at 10 lb. per acre, at bi-weekly intervals throughout the growing period. It is doubtful, however, whether the results justified the 8 to 10 applications that were necessary, for, although infestation was reduced, there was no consistent increase in yield of uninfested potatoes. DDT treatment resulted in increased infestation.—Bureau of Ent. and Pl. Quarantine, U.S.D.A.

2447. HARRISON, P. K.

Laboratory tests of new compounds as insecticides against the sweetpotato weevil.

[Publ.] *U.S. Dep. Agric., agric. Res. Administ., Bur. Ent. Pl. Quar. E-770*, 1949, pp. 5.

The results are recorded of laboratory tests at Baton Rouge, La, of a large number of new insecticides on the sweet potato weevil, *Cylas formicarius elegantulus*. Both sprays and dusts were used and results varied from 0 to 100% kill.

2448. TREHAN, K. N., AND BAGAL, S. R.

Life-history, bionomics and control of sweet potato weevil—*Cylas formicarius* F.—in Bombay Province.

Curr. Sci., 1949, 18: 126-7.

A note on an Indian investigation begun in 1947. The nature and extent of damage, the life- and seasonal-history have been studied and some control measures tried. Infestation of tubers in the field was found to be as much as 60%. In heavily manured plots, irrigated at 7-day intervals, tuber infestation was about 3%, compared with 8.7% and 17.2% in plots manured at the normal rate and irrigated at 10- and 14-day intervals respectively. No alternative host plant has been recorded, although wild *Ipomoea* spp. have been mentioned as hosts in other countries. Preliminary trials with gammexane and hexacyan (BHC group) have given encouraging results in the control of the pest.

Tung.

(See also 2615.)

2449. WEBSTER, C. C.

The tung experimental station [Nyasaland], 1940-48.

Nyasaland agric. Quart. J., 1949, 8: 1-15, bibl. 5.

An article concerned mainly with the work done at this station on the selection and propagation of *Aleurites*

montana, and with cultural, manurial, and other experiments on this crop. Notes are added on future work.

2450. LARGE, J. R.

Parasitic diseases of tung.

Plant Dis. Reptr., 1949, 33: 22-30, bibl. 24.

Seventeen diseases of tung caused by bacteria and fungi have been reported, and 6 new diseases believed to be due to fungi are under study. Nine diseases most common in tung orchards of the southern United States are described, viz. bacterial leaf spot (*Bacterium aleuritidis*); alcoholic flux (cause not determined); thread blight (*Corticium stevensii*); web blight (*Corticium microsclerotia*); black rot canker (*Phylospora rhodina*); nut rot (*Botryosphaeria ribis*); *Septobasidium* canker (*S. pseudopedicellatum*); Clitocybe root rot (*C. tabescens*); and nematode root rot (*Heterodera marioni*).—U.S. Field Laboratory for Tung Investigations, Bogalusa, Louisiana.

Other crops.

2451. SCHROEDER, C. A.

White sapote varieties in California.

Fruit Var. hort. Dig., 1949, 4: 7-9, illus.

The white sapote (*Casimiroa edulis*), a native of Mexico, is widely, though not commercially, grown for its fruit in California. Seedling selection over many years has resulted in the establishment of a few good varieties. Seven of the more important of these Californian varieties are described.—Univ. California, Los Angeles.

2452. WOLFENBARGER, D. O.

Notes on some guava insects.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 167-70, bibl. 6.

A brief discussion of some insect pests of the guava in Florida with suggestions for their control, using newer insecticides.

Noted.

2453.

a COBIN, M.

Notes on the propagation of the sympodial or clump type of bamboo.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 181-4.

b KLOTZ, L. J.

Citrus twig dieback [in California].

Calif. Citrogr., 1948, 33: 381, illus.

c SANKARAM, A.

The snake gourd (*Tricosanthus anguina* L.) in South India.

Indian Fmg., 1948, 9: 457-8, illus.

The cultivation of this vegetable.

d SITES, J. W.

Internal fruit quality [in citrus] as related to production practices.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 55-62, bibl. 14.

e STOFBERG, F. J.

Larval structure as a basis for certain identification of false codling moth (*Argyro-ploce leucotreta*, Meyr.) larvae [found on citrus and other fruits].

J. ent. Soc. Sthn Afr., 1948, 11: 68-75, bibl. 3.

f WARE, L. M., AND JOHNSON, W. A.

Effects of organic materials, fertilizers, and irrigation on the yield of sweetpotatoes.

Proc. Amer. Soc. hort. Sci., 1948, 52: 317-21.

At Auburn, Alabama.

g WARMKE, H. E., AND CRUZADO, H. J.

The flowering and seed-setting of sweet potatoes in Puerto Rico.

Science, 1949, 109: 62-3, bibl. 5.

h YUST, H. R., WELBORN, I. R., JR., AND NELSON, H. D.

Nylon tents for fumigation of citrus.

Calif. Citrogr., 1948, 33: 382, 405-6, bibl. 2.

TROPICAL CROPS.

General.

(See also 2084, 2085, 2088, 2592, 2604, 2625.)

2454. MENNINGER, E. A.

Flowering tropical trees—a planting program for Florida.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 217-23.

A popular description of some thirty beautiful exotics that might be introduced into Florida.

2455. PARHAM, J. W.

The botanical gardens, Suva [Fiji].

Agric. J. Dep. Agric. Fiji, 1948, 19: 88-105, bibl. 2, illus.

Short notes on the early history and subsequent development of the gardens are followed by a description of the present collection of trees and shrubs.

2456. HARVARD UNIVERSITY (BOSTON).

Botanical activities at Harvard, being reprinted from the *Report of the President of Harvard College and Reports of Departments*, 1947-48, pp. 48.

An account is given on pp. 34-40 of the Atkins Garden and Research Laboratory, Cuba. (1) Fertilizer experiments with sugar cane were made on the soil types at La Vega. All plots treated with nitrogen fertilizers gave higher yields of cane and sugar per acre than the untreated plots, but a combination of nitrogen and potassium gave the best results. The most important cane varieties from all parts of the world were introduced to the experimental gardens and the canes analysed. Six of these varieties proved to be superior to the standard cane both in sucrose content and in purity of juices, and will be tested on a larger scale. (2) Experiments on the control of the shrubby weed Marabú (*Dichrostachys nutans*) showed that a 5% spray of the ester of 2,4-D was the most effective of the hormone herbicides. It did not, however, kill the underground portions of the plants. The application of 20% concentrations of 2,4-D directly to the freshly cut stumps gave promising results. (3) A breeding programme is in hand to produce pepper and tomato plants in which disease resistance is combined with good fruiting qualities. Hybridization experiments

are being made to determine whether the hybrid vigour observed in the vines of sweet potato crosses occurs also in the underground portions. (4) In 1948 an entomogenous fungus was observed to parasitize and kill the sweet potato weevil (*Cylas formicarius*) on a considerable scale during the rainy season. The possibility of artificial propagation and distribution of this fungus to control the weevil is being investigated.

Cacao.

(See also 2603.)

2457. SILVA, P.

Brazil cocoa crops.

Reprinted from *Documentary Material on Cacao, Part II; Reports presented at the Meeting of the Special Committee on Cacao of the Inter-American Economic and Social Council*—3 June, 1947, pp. 11-12. Pan Amer. Union, Washington [received 1949].

A brief outline of the situation in the cocoa areas of Bahia State where 250,000 hectares of cocoa (96% of the Brazilian crop) is grown by approximately 23,000 growers, most of them small farmers. The crop ranges from 102 to 144 million kg. per annum. A cocoa experiment station was opened at Uruçuca in 1931. Some of its achievements have been: the extermination of ants [kind not stated] attacking cocoa, the exclusion of major cocoa diseases, the selection of better trees, and the rehabilitation of old plantations. The steps to be taken to increase production are outlined.

2458. CIFERRI, R.

Early "Criollo" cacao in Surinam and the origin of "Forasteros" of Trinidad and Venezuela.

Nature, 1949, 163: 953, bibl. 12.

As early as the beginning of the eighteenth century Criollo was practically the only cacao cultivated in Surinam, Venezuela and Colombia. A hypothesis is advanced for the genealogy of Forasteros of Trinidad and Venezuela.

2459. CIFERRI, R.

Symptomatology of virus diseases induced in cacao by "2,4-D" treatment.

Nature, 1949, 163: 881, bibl. 3.

In small blocks of cacao in Venezuela applications of commercial 2,4-D emulsions for weed control resulted in the appearance of shoot and leaf symptoms strongly resembling those produced by certain virus diseases. Attention is drawn to observations made in Italy that the vine reacts to 2,4-D treatment with symptoms characteristic of infectious degeneration.

2460. DARLINGTON, C. D.

Threat of disease in tropical crops.

Nature, 1949, 163: 332.

In the author's opinion the Commission of Enquiry into swollen shoot disease of cacao in the Gold Coast [*H.A.*, 19: 1936] omits from its conclusions the fundamental principle of the development of varieties resistant to infection and has postponed the application of this principle by a dangerous misstatement.

2461. BOWMAN, G. F.

Podredumbre negra del Cacao. (Black rot of cacao.)

Publ. técn. Inst. Interamer. Cienc. agric. Turrialba, Costa Rica, 29, 1948, pp. 2, illus.

The black rot of cacao, caused by the fungus *Phytophthora palmivora*, is widespread along the Caribbean coast of Costa Rica and Panama. Experiments on the control of the disease indicate that pruning, picking off the infested capsules, clearing the undergrowth and thinning out the trees to allow entry of sunlight are not adequate measures of control. Bordeaux sprays, however, at intervals of 15, 30, or 60 days were very satisfactory. Copper-lime dusts were good but more expensive. Lime and sulphur sprays proved quite ineffective.

Coffee.

2462. PERKINS, J. F.

Some investigations on a coffee estate on Mount Elgon [Kenya]. 1. General considerations in estate experimental work. 2. Results of trial-plot experiments. 3. Results of individual-tree recordings. 4. The Kapretwa series A type of coffee. 5. The closer spacing of coffee in the field. 6. The economic issue.

Mon. Bull. Coffee Bd Kenya, 1948-49, 13: 132-3, 144-5, 156-7; 14: 176-7 (=8-9),* 192-3, 197 (=24-5, 29), 38-40.

This series of articles by a planter covers certain aspects of the coffee [arabica] investigations undertaken over a number of years on Teldet Estate, Mount Elgon, which is remote from the main coffee areas of Kenya. The author believes that apart from the work of trained scientists working on experiment stations, there remains a real, though restricted, field for experimentation within which the ordinary planter can make a substantial contribution to knowledge on coffee problems. Part 1 sets forth the general premise on which the experiments were based and concludes that the over-riding essentials in a plantation experiment are simplicity of lay-out combined with close supervision of the field work. Part 2 describes pre-war field trials over 5 seasons, the results from which showed no increase in production as a result of following the more obvious methods of soil improvement which appear to give beneficial results in other parts of the world. It was decided, therefore, to attack the problem of increasing production along different lines by investigating 3 other possibilities, i.e. the selection of better types of coffee, planting more trees per acre, and growing a greater acreage. These possibilities are discussed in Parts 3 to 6. Part 3 gives the main conclusions drawn from selection work, one of which was that trees of one particular type—a vigorous, broad-leaved, bronze-tipped variety—which occur to an appreciable extent in a selection from the French Mission type, are found in practice to give an average yield over a period of years which is 50% higher than that of the field as a whole. Part 4 is devoted to observations on the Kapretwa series A type [now called Thorold's] and its very satisfactory performance

* The first number of Volume 14 was incorrectly paginated: figures in brackets are the corrections.

on Mount Elgon. Part 5 quotes results which indicate that in certain circumstances closer spacing of coffee may have substantial economic advantages. In the sixth, and last, part the author indicates in what manner costs and estate profits are likely to be affected by different circumstances and shows that, in stated conditions, an increase in the size of the plantation is sound economy.

2463. POUPART, Y.

Dix ans de culture caféière en Cote d'Ivoire.
(Coffee cultivation in the Ivory Coast 1938-48.)

Agron. trop., 1949, 4: 151-6, bibl. 2.

An account of varieties grown, environment, the technique of cultivation, and research, with notes on production figures, the improvement of the product, and the future of the industry. The kinds grown are: Assikasso (*C. abeokuta*), an improved indigenous type; robusta, the kind most liked by planters; Kouilou (*C. canephora*), grown where the dry season and the harmattan are too severe for robusta; and excelsa, which is little grown. Liberica and arabica have been abandoned. Production, which is in the hands of European and African growers, rose from 15 to 38 thousand tons during the 10-year period, and could be considerably greater.

2464. WELLMAN, F. L.

Proyecto de mejoramiento del cultivo del café en Costa Rica, por el método de selección. (A project for the improvement of coffee production in Costa Rica, by means of selection.)

Suelo Tico, 1948, 1: 363-5.

A programme of selection of coffee trees for yield, earliness, vigour and compatibility with local conditions is outlined. Seedling lines will be developed from parent trees selected over a period of 3 years. The work will be carried out by agricultural officers of the Inter-American Technical Service of Agricultural Co-operation in several districts in Costa Rica.

2465. MENDES, L. O. T., AND FRANCO, C. M.

Influência do expurgo, com bisulfureto de carbono, na germinação de sementes de café (*Coffea arabica* L.). (The effect of CS₂ fumigation on the germination of coffee seeds.) [English summary.]

Bol. téc. Inst. agron. Estado. de S. Paulo, Campinas 71, 1940, pp. 33, illus., reprinted from *Rev. Inst. Café*, 1939, 25: 1002-28 [received 1949].

The maximum concentrations of CS₂ and times of fumigation that can be used on coffee seed without impairing germination were determined. The treatment recommended for the control of coffee berry borer was found to exceed these limits.

2466. WELLMAN, F. L., AND MONTERO, J. J.

Propagación del "ojo de gallo" por la lluvia, en las fincas de café. (The spread of American leaf disease by rain in coffee plantations.)

Suelo Tico, 1949, 2: 13-16.

In field conditions the American leaf disease fungus (*Omphalia flavidia*) was found to reproduce only by a

relatively large yellow fructification and not by the spore-bearing agarics reported by some previous workers. Field and laboratory tests in Costa Rica showed that these fructifications are spread only by rain; they are not carried on the clothes of workers or by air currents. Thus the rate of spread is slow, and if all infected leaves are removed the reinfestation of a plantation can be controlled.

2467. LEFEVRE, P. C.

Derris powder—pyrethrum powder—and D.D.T. in the fight against *Antestia Prox. lineaticolli* Stal.

Pyreth. Post, 1948, 1: 1: 20-3, bibl. 3.

Laboratory tests in the Belgian Congo are reported in which powders of DDT, pyrethrum, and derris were used against antestia. Results are tabulated and the coefficient of effectiveness of pyrethrum and DDT, as calculated by the author's method, is shown.

2468. TOLEDO, A. A., DE.

Importância econômica da broca do café "*Hypothenemus hampei* (Ferr.)" no estado de S. Paulo. (The economic importance of the coffee berry borer in the State of S. Paulo, Brazil.) [English summary.]

Arq. Inst. biol. S. Paulo, 1947-48, 18: 213-38.

It is shown that where the degree of infestation by the coffee berry borer is known, the extent of the damage can be predicted. The relative economic importance of each type of damage is discussed, and the total annual loss to the State of S. Paulo is calculated.

Fruits.

(See also 2376.)

2469. W., C. E.

Banana culture [in Fiji].

Agric. J. Dep. Agric. Fiji, 1948, 19: 12-14.

Practical notes on the selection of suckers, planting, pruning, harvesting, pest control, and packing.

2470. ANON.

Jamaica's new banana.

The Times, No. 51387, 21 May, 1949, p. 4, col. 2.

It is announced that the Jamaican Department of Agriculture has produced a new variety of banana which promises to supersede both the Gros Michel and the Lacatan. It is expected to be immune from Panama disease and resistant to leaf spot. It has long, straight, stout fingers and an even colour.

2471. EASTWOOD, H. W., AND JEATER, J. W.

Supplementary watering of bananas.

Agric. Gaz. N.S.W., 1949, 60: 89-92, 130-3, illus.

The necessity for an adequate water supply for irrigating bananas under New South Wales conditions is stressed, and the advantages of irrigation are summarized. The various ways by which water can be supplied are mentioned and power supply is discussed. Designs are given for a lay-out of permanent piping when using overhead sprinklers with wide and circular coverage, and for a lay-out of piping using permanent laterals from the main.

2472. DANTAS, B.

A ocorrência da "Cercosporiose" da bananeira no Brasil, *Cercospora musae* Zimm. (The occurrence of *Cercospora musae* on banana in Brazil.) [English summary ½ p.]

Bol. téch. Inst. agron. Norte, Belem, 14, 1948, pp. 34, pp. 34, bibl. 28, illus.

The occurrence of *Cercospora musae* on bananas in the Amazon region of Brazil is reported. It is found on all the edible varieties cultivated in that region. Measures for restricting the spread of the disease are discussed.

2473. SMITH, J. H., AND WEDDELL, J. A.

Banana rust thrips control experiment, 1948.

Qd agric. J., 1949, 68: 82-5.

It is reported that a 2% DDT dust, a 4% BHC dust and a dust containing 1% DDT and 1-5% BHC all gave good control of the banana rust thrips in four moderately severe outbreaks when applied four times at fortnightly intervals from the time the bunch was thrown. The 4% BHC dust was rather more effective than the 2% DDT dust. The insecticide is, however, objectionable to use.

2474. CHUN, W. Y., AND BENEMERITO, A. N.

The cultivation of the chico fruit in South China.

Sunyatsenia, 1946, 6: 263-70 (Biol. Abstr., 1948, Vol. 22, Abstr. 25188).

This includes a botanical description of the "chico", *Achras sapota*, and discussion of its origin, cultural requirements, methods of propagation, orchard management, and economic uses. It has been successfully established in southern China.

2475. REECE, P. C., FURR, J. R., AND COOPER, W. C.

Further studies of floral induction in the Haden mango (*Mangifera indica* L.).

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 171-2, illus., being an abstract of a paper to appear in *Amer. J. Bot.*

Leaves of the mango produce a hormone during the fall and winter that causes the growing tissues in the terminal buds to develop flower clusters. In the absence of this substance, growth from these buds would be leafy shoots. As long as the terminal bud, or the flower cluster that develops from that bud, is present and undamaged, growth is suppressed in the lateral buds. Later in the season when the hormone is no longer being produced and after the flower clusters are gone, some of these lateral buds produce new leafy shoots. If the terminal bud or the flower cluster is damaged or removed during the fall or winter, some of the lateral buds immediately below begin growth. The hormone produced by the leaves at that time causes the developing tissues in these lateral buds to form a flower cluster instead of a leafy shoot which otherwise develops from such a bud in the late spring or summer. Investigations are reported which indicate that the hormone does not initiate growth and cannot affect the course of the development of a bud until cell division has started. It is emphasized that floral initiation begins shortly before the flower cluster is clearly discernible.

2476. PEREZ, V. M.

Una hormona que adelanta la fructificación de la piña. (A hormone that hastens fruiting of pineapples.)

Suelo Tico, 1949, 1: 465-7, illus.

Field trials in Costa Rica indicate that ripe fruit can be obtained within 6 months of treating pineapple plants with a 0.0015% solution of 2,4-D. If plants are treated in early spring this will ensure fruit from September to November when pineapples are scarce. This control of cropping would have a valuable stabilizing effect on the industry.

2477. SAKIMURA, K.

Residual toxicity of hexachlorocyclohexane incorporated in soil.

J. econ. Ent., 1948, 41: 665-6, bibl. 5.

Only a soil insecticide with a long residual toxicity can solve the problem of population build-up of the beetle *Anomala orientalis* in pineapple plantations. Tests carried out by the Pineapple Research Institute, Honolulu, Hawaii, indicated that, contrary to previous findings, the residual toxicity of benzene hexachloride is comparable with that of DDT. After 19 months a dose of 12 lb. per acre still gave 99% kill of *Anomala* grubs.

2478. LINFORD, M. B., OLIVEIRA, J. M., AND ISHII, M.

Paratylenchus minutus, n.sp., a nematode parasitic on roots.

Reprinted from *Pacific Sci.*, 1949, 3: 111-19, illus.

A very small nematode that occurs in great abundance in certain pineapple fields on the island of Oahu and less widely on Molakai and Maui, Hawaii, is described as *Paratylenchus minutus* Linford. It is relatively tolerant of slow desiccation but about equal to *Heterodera marioni* in sensitivity to soil fumigants. Its host range is wide, and 25 known host plants representing 15 families are listed.

Palms.

2479. BATISTA, A. C.

Catacauma torrendiella n.sp. agente da verrugose do coqueiro. (*Catacauma torrendiella* n.sp. the cause of coco-nut wart disease.)

Bol. Agric. Pernambuco, 1948, 15: 129-33 from abstr. in *Rev. appl. Mycol.*, 1949, 28: 124.

In 1945 a disease involving the leaves, rachides, peduncles, and fruits of coconut palms, was observed for the first time in Bahia, Brazil. The causal organism is described.

2480. C., A.

L'huile de Caiaué (*Elaeis melanococca*). (Caiaué oil.)

Rev. int. Bot. appl., 1948, 28: 360.

An abstract from Paul Le Cointe's recent work *Arvores et plantas uteis* [of the Amazon]. It is suggested that this palm might prove useful in plant breeding. Its pulp [pericarp ?] contains 47% of oil and its kernels 36%.

2481. VANDERWEYEN, R., AND MICLOTTE, H.
Valeur des graines d'*Elaeis guineensis* Jacq. livrées par la station de Yangambi. (The value of the oil palm seed released by the Yangambi station.)
Publ. Inst. nat. Etude agron. Congo belge, Sér. tech. 37, 1949, pp. 23, bibl. 2, 15 Fr.
Deals with choice of parent palms, their characteristics, crossing, and the estimated yield of their progeny. Where growth conditions are similar to those at Yangambi, yields from first category seed (*tenera* × *dura* and *dura* × *pisifera*) should reach a minimum of 13 tons of fruit bunches per hectare from the seventh year. Second category seed would yield about 1 ton less.
2482. HOMÈS, M. V.
L'alimentation minérale du palmier à huile. (Mineral nutrition of the oil palm.)
Publ. Inst. nat. Etude agron. Congo belge, Sér. sci. 39, 1949, pp. 124, 100 Fr.
The first part of this work reports experimental results from the Belgian Congo, while the second (pp. 113-22) is devoted to a general discussion of the subject.
2483. BACHY, A.
Étude sur le "Boyomi" et quelques autres maladies graves du palmier en Afrique. (The study of Boyomi and some other serious diseases of [oil] palms in Africa.) [English abstract 10 ll.]
Oléagineux, 1949, 4: 421-6, bibl. 7, illus.
Most of this article is devoted to a popular account of the disease Boyomi [lit. to become dry], with notes on its symptoms as observed in the middle Congo, its epidemic character, the areas affected, and research in progress. The author also describes, more briefly, vascular wilt (*Fusarium oxysporum*), "plant failure", and trunk rot (*Armillaria mellea*). He concludes that the above four diseases constitute a serious threat to the development of *Elaeis* in Africa.
2484. TKATCHENKO, B.
Le sucre de palme du Cambodge. (The sugar palm [*Borassus flabellifer*] of Cambodia.)
Agron. trop., 1948, 3: 563-93, bibl. 42, illus.
A comprehensive paper incorporating the results of investigations in Indo-China during 1938-40. It covers the botany, local importance, and cultivation of the palm, its numerous products, the tapping, yield, and composition of its sap, the manufacture, yield, and composition of its sugar, the causes of low-quality sugar, the economics of production, and methods for improving quality.
2486. SCHULTES, R. E.
The importance of plant classification in hevea.
Econ. Bot., 1949, 3: 84-8, illus.
A popular account of the commercial potentialities of the genus *Hevea*, showing the value of a better knowledge of the wild species for plant breeding purposes.
2487. DUCKE, A.
Novas contribuições para o conhecimento das seringueiras da Amazonia Brasileira II. (New contributions to the identification of *Hevea* spp. in the Amazon basin of Brazil. II.)
Bol. técn. Inst. agron. Norte, Belem, 10, 1946, pp. 24 [received 1949].
Although *Hevea* is a very well defined natural genus, the species are less easily determined. An extensive study in the Amazon basin showed that many of the characters previously used to distinguish the species were variable, and therefore valueless for classification purposes. The author considers there are 9 true species only. The distinguishing features, main botanical characteristics, distribution and varieties of each are described.
2488. BALDWIN, J. T., Jr.
Loss of oil from hevea seed. A variation having phyletic and economic implications.
J. Hered., 1949, 40: 47-9, bibl. 11.
The seeds of certain species of hevea were found to make greasy patches on the herbarium sheets resulting from loss of oil. *H. rigidifolia* and *H. kunthiana*, seeds of which are regularly selected as food by the Amazonian native, were outstanding in this respect. Loss of oil also occurred in occasional trees of *H. brasiliensis*, *H. benthamiana* and *H. guianensis*, good rubber producing species. It is suggested that this character might be introduced into plantation rubber, so that the seeds could be used as a by-product, and also that certain trees of *H. rigidifolia* and *H. kunthiana* might form a basis for a seed-oil industry. This character of oil loss is shown to throw light on the genetical relationships of hevea species.—College of William and Mary, Williamsburg, Virginia.
2489. MENDES, L. O. T.
Investigações preliminares sobre a duplicação do número de cromossomos da seringueira pela ação da colchicina. (Preliminary investigations on the doubling of the chromosome number of hevea by the action of colchicine.) [English summary 3½ pp.]
Bol. técn. Inst. agron. Norte, Belem, 7, 1946, bibl. 21, illus. [received 1949].
In an attempt to improve the yield of *Hevea brasiliensis* strains selected for resistance to leaf blight, the author investigated the possibility of inducing chromosome doubling in the selected clones. The work is based on the evidence of Gunnery [see *H.A.*, 5: 710] that high-yielding clones contain sieve tubes and latex vessels of large diameter. Doubling of the chromosomes was achieved most successfully by colchicine treatment of germinated seeds. A plan is outlined for the investigation of colchicine effects on yield and resistance to leaf blight.

Rubbers.

(See also 1929, 2317, 2318f.)

2485. COMPAGNON, P., AND ZILLER, R.
L'Institut des Recherches sur le Caoutchouc en Indochine [I.R.C.I.]. (The Rubber Research Institute of Indochina.)
Cahiers I.R.C.I., 1948, 3: 1-12.
A description of this institute, created in 1941, with an office in Paris and a central station at Laikhe, together with details of numerous investigations at four of its experimental stations.

2490. CRAMER, P. J. S.

Het planten van klonale zaailingen. (Clonal seedlings [of hevea].)

Bergcultures, 1949, 18: 122-31.

Clonal seedlings of hevea are being increasingly planted in Java and Sumatra. In this paper read to the Kedirische Landbouw Vereniging on 29 November, 1941, the best methods of growing such material, including propagation, planting distances and thinning systems, are discussed. It is pointed out that clonal seedlings differ in behaviour from both ordinary seedlings and budded stock, and the cultural technique must be modified accordingly. As they show much greater variation than budded stock, selective thinning will have a correspondingly greater effect on yield.

2491. HEUER, J. H., AND LOOMIS, H. F.

Use of lanolin and other unguents for improving budding in *Hevea* rubber trees.

J. agric. Res., 1947, 75: 207-13.

In experiments at the U.S. Plant Introduction Garden, Coconut Grove, Fla, the use of 1:1 lanolin beeswax mixture enabled wounds in *Hevea* trees to heal more rapidly than did any other substance. A mixture of 3:1 lanolin beeswax mixture also proved extremely successful for covering bud patches or application when unwrapping the buds. Buds treated with 3:1 mixture were found to sprout more slowly after cutting back the stocks than did untreated ones.

2492. RUBBER RESEARCH SCHEME (CEYLON).

Tapping young budded areas.

2nd Suppl., *Advis. Circ. Ceylon Rubb. Res. Sch.* 17, revised 1949, pp. 2.

Latex from young trees in general has a tendency to precoagulation. Advice is given on the preparation and use of sodium sulphite and ammonia anti-coagulants to prevent precoagulation in the field, or during transport to factory. A stock solution of 1 lb. commercial anhydrous sodium sulphite in 3 gal. water should be prepared daily and used on tapping cuts and in latex buckets at the rate of about $\frac{1}{2}$ pint for every 4 gal. of latex collected. The solution is added to transport tanks at $\frac{1}{2}$ pint per 4 gal. of latex. Ammonia, 1% solution, can be used instead of sodium sulphite at the rate of about 6 $\frac{1}{2}$ fl. oz. per 4 gal. of latex. These quantities of sulphite or ammonia can be doubled, or even trebled, if found to be insufficient. Instructions are given for carrying out a trial coagulation to determine rubber content.

2493. SCHMÖLE, J. F.

Tappen met twee sneden, die op grote onderlinge afstand zijn uitgezet. (A tapping system, consisting of 2 widely-separated cuts.)*

Bergcultures, 1949, 18: 133-6.

Where trees are tapped on the system (S/2, d/1, m/2, 100%), a cut round half the circumference being tapped every other month, it is possible to increase the yield by 50-80% by tapping a second cut 1.50-1.75 m. above the first (2S/2, d/1, m/2, 200%). The best results are obtained by tapping the two cuts in alternate months. Clones were found to vary in their response to the relative position of the cuts. During the trial

period of 1 year in the Experimental Gardens at Polonia there were no signs that this treatment was putting too great a strain on the trees; further trials, however, are needed to confirm this. In the meantime the author advises the use of the 2-cut system only in cases where the bast reserve is good and the trees are over 10 years old.—General Experimental Station, A.V.R.O.S.

2494. BUGNIGOURT, F.

La maladie des "Raies Noires" de l'écorce saignée. (The Black Stripe disease of renewing bark [affecting *Hevea*].)

Cahiers I.R.C.I., 1946, 2: 41-67, bibl. 47, illus. [received 1948].

A long and detailed description of the disease and its causative organism [*Phytophthora* sp.], with notes on some control measures.

2495. MARTIN, W. J.

Moldy rot of tapping panels of *hevea* rubber trees.

Circ. U.S. Dep. Agric. 798, 1949, pp. 23, bibl. 20, illus. 3.

The causal organism is indistinguishable morphologically from *Ceratostomella fimbriata*. The damage lies chiefly in a reduction of time over which trees can be tapped. The results recorded suggest that the most effective method of control at present is to exclude the fungus from new plantings and to attempt to eradicate it from such plantings when first observed. Fungicide trials have not yielded satisfactory results.

2496. CHEVALIER, A.

Nouvelles plantes à caoutchouc du Nord du Brésil. (New rubber plants from the north of Brazil.)

Rev. int. Bot. appl., 1948, 28: 364, bibl. 1.

A note on Bondar's recent publication "Arvores laticíferas na Bahia et nova industria extrativa de Gomas". The following plants and their characteristics are mentioned: *Mucugê* (*Couma rigida*), *Piquiã* (*Macoubea guianensis*), *Chananão* (*Lacmellea pauciflora*), and *Pan de Culher* (*Tabernemontana* sp.).

2497. BEKKEDAH, N., AND SAFFIOTI, W.

Latex e borracha de mangabeira. (The latex and rubber of the mangaba tree.)

Bol. técn. Inst. agron. Norte, Belem, 13, 1948, pp. 43, bibl. 16.

The mangaba tree (*Hancornia speciosa*) was exploited for the production of rubber during the war, but the best method of tapping and latex coagulation have yet to be determined. Under good conditions the tree may yield as much rubber as *hevea*, and involve less labour in tapping. The latex, however, is very stable, which makes coagulation difficult. This paper presents the results of trials to determine the best method of coagulation. A dilute solution of HCl (about 0.5%) or the latex of *Ficus anthelmintica* (about 5%) were found to be the most efficient coagulants for commercial purposes. *Ficus* latex is especially valuable where the trees are found locally, but as it is not stable, transport is impracticable. Solutions of NaCl or alum, which are used as coagulants by the natives, result in a poorer quality of rubber. There are indications that it may be possible to develop a process in which coagulation

* First published in English during the Japanese occupation in 1943.

is achieved by agitation alone. Results of determinations of D.R.C., total solids, and chemical composition of the latex, and measurements of density and physical properties are presented.

2498. SAFFIOTTI, W.

Sobre o polimorfismo dos carbhidretos das balatas. (The polymorphism of the hydrocarbons of *Mimosa* spp.) [English summary $\frac{3}{4}$ p.]

Bol. técn. Inst. agron. Norte, Belem, 9, 1946, pp. 36, bibl. 23 [received 1949].

Evidence is given to prove that the hydrocarbons of the latex of *Mimosa bidentata* and *Ecclinusa balata* are identical, and the polymorphism of these hydrocarbons is ascertained. Certain physical properties of balata are investigated and compared with those of rubber.

Sugar cane.

(See also 1730, 2456, 2595, 2598.)

2499. KELLER, A. G.

The Hawaiian sugar industry.

Sugar J., 1948, 11: 5: 5-6, 8, 10-13; 11: 6: 11, 20-3.

A report on certain field and factory aspects of the industry written after a visit to Hawaii in 1946.

2500. NANGLE, E. L.

The sugar industry in Cuba.

Proc. 16th Conf. Qd Soc. Sugar Cane Tech., 1949, pp. 7-12.

A brief description of the island, its administration, climate, trade and economics, with some notes on the sugar-cane industry, mainly from the factory standpoint.

2501. EVANS, H.

A brief review of the work of the Mauritius Sugarcane Research Station 1930-48.

Rev. agric. Maur., 1949, 28: 12-20.

Some of the main achievements of this station, established in 1930, have been in breeding better sugarcane varieties (its seedling M 134/32 is now grown on over 80% of the cane area), in devising methods for determining the fertility status of soils (including the foliar diagnosis technique), and in developing the use of selective herbicides.

2502. BUZACOTT, J. H.

Recent varietal history and seedling programme for the Mackay district [Queensland].

Proc. 16th Conf., Qd Soc. Sugar Cane Tech., 1949, pp. 137-43, bibl. 7.

An account of the changes that have taken place in varieties of sugar-cane planted in the period 1933-47. Cane growing in the district has taken on a new lease of life with the recent introduction of improved varieties. The percentage of the crop under Queensland varieties has risen from approximately 23 in 1942 to 60 in 1947. Information is given on the long-range breeding programme.

2503. ENGARD, C. J., AND LARSEN, N.

Floral development in sugarcane.

Bien. Rep. Hawaii agric. Exp. Stat. 1946-48, 1948, pp. 125-32, illus.

A study of structural development with particular reference to the formation of the inflorescence.

2504. KNOWLES, W. H. C.

The variety and fertilizer position of the sugar industry, XIII.

Sugar Bull. Brit. Guiana Dep. Agric. 16, 1948, pp. 47-53.

The composition of the estate-grown cane crop (97% of the whole) harvested in 1948 is given as: B.34104, 22.6%; CO.421, 19.3%; D.14/34, 17.4%; Diamond 10, 14.4%; POJ 2878, 13.6%; others, 12.7%.

2505. KNOWLES, W. H. C., AND CAMERON, C.

Field experiments with sugar cane, XVI.

Sugar Bull. Brit. Guiana Dep. Agric. 16, 1948, pp. 1-46.

A record of results from 39 variety-, 8 manurial-, and 9 cultivation-trials carried out in 1947. No new cane proved itself to be clearly better than the existing commercial varieties. Estates are advised to continue using B.34104 and D.14/34, and to a lesser extent CO.421, for their main plantings.

2506. BORDEN, R. J.

Sunlight and sugar yields.

Hawaii Plant. Rec., 1949, 53: 43-5.

A short report on a study in Hawaii of the relationship between total sunshine over three 12-months growing periods and the yields of pot-grown sugar-cane during the same periods. The best yields of cane and sugar, and the best quality cane, were obtained from the plants receiving the greatest total amount of sunlight, i.e. 3,328 hours over a growing period from March to March.

2507. STORY, C. G.

Cutter planters [for sugar-cane] in the Mackay District [Queensland].

Cane Gr. Quart. Bull., 1949, 12: 180-90, illus.

Descriptions are given of the Willman, Milne, Hodge, Bauple, Harris, and I.H.C. machines for planting sugar-cane.

2508. WADDELL, C. W.

The topping of cane.

Proc. 16th Conf. Qd Soc. Sugar Cane Tech., 1949, pp. 121-8, bibl. 9, illus.

As a result of 13 complete tests, extending over all districts of Queensland, and covering 9 varieties of cane, the most economic point of topping was found to be at the normal point or one internode below. The estimated decrease in net value of the crop to the grower when cane is topped above or below this point is severe, and justifies strenuous efforts to secure a high proportion of properly-topped stalks, whether hand or machine cutting is employed. [From author's summary.]

2509. WIEHE, P. O.

Results of some experiments on smut [*Ustilago scitaminea*] of sugarcane in Mauritius.

Rev. agric. Maur., 1949, 28: 7-11.

The results refer to work done during 1939-41 when the smut-susceptible variety BH 10/12 was grown on a large scale. The standard variety in the island to-day,

M 134/32, is highly resistant or immune to the disease. Smut reaches epidemic proportions only in the lowlands of the Island, for the most part below the 300 ft. contour.

2510. HUGHES, C. G., AND STEINDL, D. R. L.
The stalk rots of standing cane [in Queens-
land].

Cane Gr. Quart. Bull., 1949, 12: 172-9, illus.

The most important of these diseases are red rot (*Phylospora tucumanensis*) and rind disease (*Pleocysta sacchari*). Pokkah boeng (*Gibberella moniliforme*), pineapple disease (*Ceratostomella paradoxa*) and mosaic also exist and may cause damage on occasion.

2511. KHANNA, K. L., AND SHARMA, S. L.
Commercial D.D.T. as an insecticide on
sugarcane crop.

Curr. Sci., 1949, 18: 129-30, illus.

A report from India of damage to sugar-cane leaves resulting from a 0.3% solution of a proprietary brand of DDT [name not stated] used against pyrrilla. In another experiment using a stock solution of DDT [origin not stated] in turpentine and toluene diluted with water, concentrations greater than 0.2% adversely affected the sucrose content of the cane.

2512. CHEU, SEH-PONG, and LI, SHON-SING.
Laboratory experiments on the control of
sugarcane woolly aphid (*Oregma lanigera*
Zehntner) with yam seed oil emulsion and
tobacco leaf extract. [Chinese with sum-
mary in English.]

Kwangsi Agric., 1942, 3: 179-89, bibl. 6
from *Abstr. in Rev. appl. Ent.*, 1949, 37:
74.

Sprays containing 1% camphor oil or tea seed oil emulsified with sodium oleate were ineffective, but emulsions of the seed oil from yam bean [*Pachyrhizus erosus*] showed promise. Practically all aphids with thin wax coatings were killed by a spray containing 1% of this oil having a G-S value of 0.2. Only about 10% mortality of aphids with a thick wax coating was given by 1% oil with a G-S value of 0.51. Free nicotine (95%) in sprays containing 0.3% sodium oleate was effective against aphids with thin and thick wax coatings at concentrations of 1: 8,000 and 1: 4,000 respectively. Tobacco-leaf extract (2.35% nicotine) killed 84-97% of the aphids with thick wax coatings at concentrations of 1: 40-1: 200 with 0.5% sodium oleate added.

2513. BUZACOTT, J. H.
Anoplognathus boisduvali Boisd. as a pest
of sugar cane [in Queensland].
Proc. 16th Conf. Qd Soc. Sugar Cane
Tech., 1949, pp. 133-5, bibl. 6, illus.

A record of damage to sugar-cane from larvae of the Christmas beetle, *A. boisduvali*, a rare occurrence.

2514. GUPTA, B. D.
Control of sugarcane leaf hopper (*Pyrilla*
sp.) in the U.P. [India].
Indian Fmg., 1948, 9: 401-8, bibl. 4.

A popular account of this pest, a major one in the United Provinces, based on studies begun in Muzaffarnagar in 1934. The following measures have been

found effective in minimizing *Pyrilla* attack: removal of cane trash and sprouts from stubble, catching adults and nymphs in hand nets, destruction of egg-masses, stripping of dried leaves. A wooden leaf-stripper, home-made, is illustrated.

Tea.

(See also 2551, 2615, 2624.)

2515. HAINSWORTH, E.
A visit to the tea-growing districts of
Southern India.

Plant. Chron., 1949, 44: 203-7.

Some notes on a visit paid in August, 1948. The writer, who is a tea pathologist at the Tocklai experiment station, N.E. India, touches briefly on the following: spraying and dusting machines, defoliation, *Helopeltis* control, effect of different tipping and pruning heights, the results of reducing shade and adopting new pruning systems following the advent of blister blight, new problems in S. India, and some comparisons between S. Indian tea factories and those in N.E. India.

2516. WEBB, H. W. T.
Tea culture. Some notes on cultural
practices at the Tea Experimental Station,
Mlanje [Nyasaland].
Nyasaland agric. Quart. J., 1949, 8: 15-25,
bibl. 7.

Short descriptions are given of the standard methods, or modifications of them, adopted as a result of experience, experiment and observation. The subjects of manures, shade, pests, diseases, and vegetative propagation are briefly dealt with, as well as the usual nursery and field practices.

2517. NORRIS, R. V., AND OTHERS.
Proceedings of the eighth conference of the
Tea Research Institute of Ceylon, 1949.
Tea Quart., 1949, 20: 2-46.

A full report of the proceedings, including papers entitled: The work of the Tea Research Institute, Nutrition in relation to disease, Yield in relation to bush growth, Tea manufacture, and Tea standards.

2518. HAAN, I., DE.
De physiologie der bladvorming bij thee.
(Physiology of leaf formation in tea.)
[English summary 1 p.]
Arch. Theecult. Ned.-Ind., 1949, 16: 83-125,
bibl. 19, illus.

The causes of periodicity in the growth cycle of tea are discussed. Investigations into the effect of light, rainfall, nitrogen, leaf area and certain internal factors on leaf formation led to the following conclusions. Although climatic factors influence the length of the growth period, they are not the primary cause of periodicity. This is a nutritional effect, and is due to the fact that during the flush of growth more food is used up than can be synthesized; a rest period is ultimately enforced by exhaustion of the food reserves. Growth will start again as soon as sufficient food has accumulated and climatic conditions are suitable. The following cultural recommendations are made,

based on the results of these investigations:—(1) stimulate vigorous leaf production by maintaining good soil conditions and a high nitrogen content, (2) close planting is advisable, as the central portion of the bush has greater vigour than the periphery, (3) a good stand of shade trees has a regulating influence on production, especially on poor soils, (4) selected clonal material should be used for planting as the capacity to produce side shoots is to a certain extent an inherent quality. Clonal stocks have been selected for the low auxin content in their apical buds, and therefore show less apical dominance.

2519. VAN EMDEN, J. H.

Shade ams thee door *Heterodera marioni*.
(Damage to tea plantations by *Heterodera marioni*.)

Bergcultures, 1949, 18: 163-7, bibl. 8.

During the last year eelworm has caused serious damage to young tea plantations in Indonesia. Little is known about this pest in relation to tea, except that only young plants are attacked. Provisional instructions are here given to growers wishing to plant up new land. *Tephrosia vogelii* and certain weeds may be used as test plants. If the land is infected it should be cleaned, and sown with a cover crop of *Crotalaria usaramoensis*, a resistant species, to reduce the eelworm population by starvation. "Stump" plants, reared in the nursery, may then be planted with safety. Results of soil fumigation experiments with DD have not yet been published.—C.P.V. Proefstation, Buitenzorg.

Other crops.

(See also 2050-2057, 2061d, 2212, 2218, 2319q, 2586-2613.)

2520. KIRBY, R. H.

Abroma augusta fibre from Uganda.

Bull. imp. Inst. Lond., 1948, 46: 192-7, bibl. 5.

Abroma augusta is a perennial bushy plant belonging to the *Sterculiaceae*. It is native to the hotter parts of India, and is found also in Java, China, Malaya and the Philippines. Its usual habitat is moist, secondary scrub. It has been introduced into the Belgian Congo, West Africa and Uganda. Its cultivation, harvesting, and the preparation of its fibre are described. Yield figures are quoted ranging from 100 to 2,600 lb. per acre [it is not clear whether these figures refer to stems with leaves or stems alone]. The fibre content is given as 4-8% of the freshly cut defoliated green stems. A report is given on a sample of fibre from Uganda. The fibre resembles that of *Hibiscus cannabinus*. It has been suggested that *Abroma augusta* might be used to eradicate Lalang grass, since it is able to grow through the grass and suppress it. One disadvantage of the plant is the fact that its leaves and stalks have irritant hairs, making it unpleasant to handle.

2521. DAVIS, T. A.

An unrecorded insect pest of the cashew tree (*Anacardium occidentale* L.) in South India.
Curr. Sci., 1949, 18: 133, bibl. 1, illus.

A report of *Catacanthus* sp. nov. attacking cashew trees

growing on the west coast of India, particularly in Travancore. The bug, which closely resembles *C. incarnatus*, is a menace to cashew plantations.

2522. FAIRCHILD, D.

Early experiences with the Chayote [*Sechium edule*].

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 172-8.

Mainly concerned with the introduction of this useful vegetable into the U.S.A. and the failure to popularize it there.

2523. PORTÈRES, R.

Germoirs à semences de *Cinchona* type "Sérédou". (The Sérédou type of germinator for *Cinchona*.)

Agron. trop., 1949, 4: 157-60, illus.

It is claimed that this type of seedbed, devised at Sérédou, French Guinea, and in use there for 9 years, is quite different from the usual type. It is based on observations of the beneficial effect of light on the young seedlings. [*Cinchona* seedbeds are usually heavily shaded.] The essential part of the germinator is its roof, made of two movable, thatched panels, which can be set at open, half-open, or shut positions suitable for conditions during different times of the day and the various seasons of the year. Notes are given on dimensions, materials, and costs.

2524. MAY, W. B.

Horticultural work with the clove tree in Zanzibar.

Gdnrs' Chron., 1949, 125: 178-9.

A brief account of the steps that are being taken to overcome the "Sudden Death" of cloves, and of the peculiar difficulties that confront the pathologist working with clove material.—Clove Research Scheme, Zanzibar.

2525. PARHAM, B. E. V.

Duruka—an edible flower.

Agric. J. Dep. Agric. Fiji, 1948, 19: 16, bibl. 6.

A note on *Saccharum edule*, which is cultivated as a seasonal vegetable, the unopened flowerbud, commonly called Fiji asparagus, being eaten. Several varieties occur. The incorrect determination of this plant in the past is mentioned.

2526. COOMBER, H. E., AND COOMES, T. J.

Gum arabic from Tanganyika.

Bull. imp. Inst. Lond., 1948, 46: 231-4.

A report on 3 samples from *Acacia* spp. grown in the Western Province, all of them "most encouraging".

2527. TAMMES, P. M. L.

Sortering van nootmuskaat op hoog gehalte aan etherische olie. (Classification of nutmegs according to essential oil content.)
Landbouw, 1949, 21: 65-7.

The essential oil content of nutmegs is of secondary importance for the spice industry; for preserving purposes the distilled oil is used. Analyses at the Laboratory of Chemical Research, Buitenzorg, Java, showed that unripe, "wrinkled" and "Padang" nuts

have a much higher essential oil content than the low quality, i.e. broken, wormy, and punky, B.W.P. nuts. Where low quality nuts are to be disposed of, it is suggested that the former should be sent to the distilleries and the latter to the spice mills.

2528. SLOOFF, D. W. C.

Over de oorzaak en de bestrijding van inwendige schimmel in de muskaatnoot. (The cause and control of mouldiness in nutmegs.) [English summary 2 pp.]

Landbouw, 1949, 21: 43-60, bibl. 12, illus.

Methods of harvesting, curing and storage of nutmegs were tested at Macassar, in an attempt to reduce the percentage of mouldy nuts in export shipments. Freshly picked nuts showed a much lower percentage of mouldiness than those gathered from the ground. Rain during harvest had no effect on the soundness of the nuts. It was found advisable to start the curing process at a moderate temperature (35-40° C.) to prevent the shells cracking; these cracks may be almost invisible but will result in considerable infection. Exporters are advised to store in a drier climate than is possible in the nut-producing islands round Java, as a relative humidity of 85% will increase the mouldiness of sound nuts by 66%.—General Agricultural Experiment Station, Buitenzorg.

Noted.

2529.

a ASTHANA, R. P.

Diseases of *Piper betle* [in India] and their control.

Indian Fmg, 1947, 8: 394-7.

b CATALA, R.

Sur une grave menace que fait peser sur les cocoteraies des Nouvelles-Hébrides l'extension de *Graeffea cocophaga* New. (Concerning a serious menace which threatens the coconut plantations of the New Hebrides: the spread of *Graeffea cocophaga*.) *Rev. int. Bot. appl.*, 1948, 28: 354-7, bibl. 2, illus.

c CHEESMAN, E. E.

Classification of the bananas. III. Critical notes on species. g. *M. itinerans* Cheesman, sp. nov.; h. *M. ornata* Roxb. *Kew Bull.*, 1949, No. 1, pp. 23-8, bibl. in text, illus.

d CHEVALIER, A.

La situation des plantations d'Hévéa dans le monde de 1939 à 1948. (The state of the world's Hevea rubber plantations from 1939 to 1948.)

Rev. int. Bot. appl., 1948, 28: 297-316, bibl. 1.

e COHEUR, C.

Essais de rouissage sur *Urena lobata*. (Retting trials with *Urena lobata* [in Belgian Congo].) *Bull. agric. Congo belge*, 1948, 39: 841-54, illus.

f DUCKE, A.

Plantas de cultura precolombiana na Amazônia Brasileira. Notas sobre as espécies ou formas espontâneas que supostamente lhes teriam dado origem. (Plants of pre-Columbian culture in the Amazon basin of Brazil. Notes on species and forms that are supposed to have given rise to them.)

Bol. técn. Inst. agron. Norte, Belem, 8, 1946, pp. 24 [received 1949].

g GORDON, S. A., AND SÁNCHEZ NIEVA, F.

The biosynthesis of auxin in the vegetative pineapple. I. Nature of the active auxin.

II. The precursors of indoleacetic acid. *Arch. Biochem.*, 1949, 20: 356-66, bibl. 13, and 367-85, bibl. 28.

h HENRY, P.

Un *Elaeis* remarquable: le palmier à huile vivipare. (A remarkable *Elaeis*: the viviparous oil palm.) *Rev. int. Bot. appl.*, 1948, 28: 422-7, illus.

Botanical description of a mutation reported earlier. [*Oléagineux*, 1948, 3: 546; *H.A.*, 18: 612.]

i KRAUSS, B. H.

Anatomy of the vegetative organs of the pineapple, *Ananas comosus* (L.) Merr. II. The leaf.

Bot. Gaz., 1949, 110: 333-404, illus.

j MAAS, J. G. J. A.

De ondernemingsrubber van Sumatra's oostkust in 1948. (Rubber production figures for the east coast of Sumatra in 1948.)

Bergcultures, 1949, 18: 147-9.

k MÜNTZING, A.

Some observations on pollination and fruit setting in Ecuadorian cacao.

Hereditas, 1947, 33: 397-404, bibl. 10, illus. [received 1949].

l POPENOE, W.

Cinchona cultivation in Guatemala—a brief historical review up to 1943.

Econ. Bot., 1949, 3: 150-7.

m ROBBIE, J.

The tolerance of garden plants, fruit trees and some indigenous species to immersion in flood water in Blue Nile Province.

Reprinted from *Sudan Notes and Records*, 1947, 28: 187-90 [received 1949].

n SANKARAM, A.

Cultivation of *Dioscorea alata* L. [in India]. *Indian Fmg*, 1948, 9: 411-12.

Practical advice on growing this crop.

o STAHL, A. L., LYNCH, S. J., AND MUSTARD, M. J.

Research in tropical horticulture at the University of Miami.

Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 178-81.

p SWEZEY, O. H.

Work in progress and future plans.

Insect invaders in Hawaii during and since World War II.

J. econ. Ent., 1948, 41: 669-72.

STORAGE AND PLANT PRODUCTS.

Storage.

(See also 1834, 1872, 2279.)

2530. HOARD, B.

Labor-saving machinery developed.*Bett. Fr.*, 1949, 43: 10: 7, 22-4.

Discusses latest developments in automatic warehouse machinery to be used in fruit stores.

2531. SPACKMAN, K. H.

Elimination of reject fruit from packing shed. Device simply adapted to grading machine.*N.Z. J. Agric.*, 1949, 78: 131.

Details are given of an equipment consisting of a feed elevator which carries the fruit from the hopper of the grader on to an eliminator belt, which sorts out under-size fruit, and an escalator which carries rejected fruit to a container, outside the packing shed, consisting of a series of telescoped drums. The whole equipment is driven by a 4 h.p. electric motor which is independent of the grader motor.

2532. FOULON, J.

Entreposage frigorifique des fruits. (Cold storage of fruits.)*Fruit belge*, 1949, 17: 97-102.

A general account of cold storage of fruits discussed under: prerefrigeration, the conditions in the cold chambers, storage in gas chambers, the equipment of the storage chambers, the absorption of volatile substances, storing grapes.

2533. ULRICH, R.

Le rôle du froid dans la mise en valeur du verger français. (Cold storage as a factor in the improvement of the French fruit industry.)*Jardins Fr.*, 1949, 3: 59-70, illus.

The precise conditions of storage required by Williams' pears have been worked out at the Station expérimentale du Froid, Mendon-Bellevue, and are reported here, together with details of apple and grape storage obtained from various sources.

2534. CASTBERG, C.

SPF:s Lagringstävling 1947-48. (Apple storage competition of the Swedish Pomological Society 1947-48.)*Fruktodlaren*, 1948, No. 4, pp. 102-4.

For an account of the scheme see *H.A.*, 15: 1301, and for results in early years *H.A.*, 16: 2246 and 17: 1757. Of the varieties compared, Cox's Orange scored highest marks both for freedom from fungus and physiological diseases and for preservation of quality, followed by Cox's Pomona and Ribston and finally by Signe Tillisch and Gravensteiner.

2535. REIMER, U.

Lagerhus och packningscentral för äpplen och päron. (A co-operative store and packing shed for apples and pears.)*Sver. pomol. Fören. Årsskr.*, 1948, 49: 5-30, bibl. 7.

Detailed plans are submitted for a storage and packing

shed with offices, etc., to be erected and run co-operatively in apple and pear growing areas. The plans provide storage capacity for 2 million kg. with a turnover of 2.5 million kg. Twenty-five per cent. of the fruit are to be kept in cold storage, the rest in ventilated storage.

2536. KESSLER, H.

Rissbildung auf der Haut des Lagerobstes.**(Skin cracking of apples.)***Schweiz. Z. Obst- u. Weinb.*, 1949, 58: 125-7, bibl. A.

During the winter 1948/49 losses in the apple variety Damason Reinette, normally a good keeper, were very severe in cold storage at Wädenswil. They were caused by rot fungi which penetrated into the fruit through cracks in the skin. Reference is made to V. Shatak's and A. L. Schrader's paper on skin cracking in apples in *Proc. Amer. Soc. hort. Sci.*, 1948, 51: 245-57 (*H.A.*, 18: 2539). Observations show that the trouble is associated with lack of vigour in the tree.

2537. AUBERT, P.

Essais relatifs à la sensibilité à la pourriture de quelques variétés de pommes. (The development of storage rots in some apple varieties.)*Rev. romande Agric. Vitic.*, 1949, 5: 45-8.

The author continued his storage trials (see *H.A.*, 19: 657) at Lausanne in a Krebsler cellar and in cold storage, this time with 4 apple varieties, including Belle de Boskoop and Canada Reinette. Data are presented for rot incidence, evaporation losses and financial returns. In varieties with a rough skin evaporation losses were higher than in those with a smooth skin. Prolonged storage proved to be profitable only where waste was kept to a minimum.

2538. BOYES, W. W., AND DE VILLIERS, D. J. R.

"Dual-temperature" storage of plums.*Fmg S. Afr.*, 1949, 24: 255-60, bibl. 5.

A report on 1939-40 storage trials in S. Africa with Santa Rosa, Wickson, Gaviota, and Kelsey plums to test the effect of dual-temperature storage, i.e. 32° F. for 5-10 days, then 45° and 50° F. for the rest of a total storage period of 25 days. These trials indicate that as regards Santa Rosa and Wickson the best treatment was storage at 32° F. for 10 days followed by storage at 50° F. for 15 days.

2539. ÖSTLIND, N.

Försök med korttidsförvaring av jordgubbar och hallon 1948. (Short-term storage trials with strawberries and raspberries in 1948.)*Sverig. pomol. Fören. Årsskr.*, 1948, 49: 83-8.

Trials carried out at Alnarp showed that (1) the fruits keep better in cool storage at 9° C. than in ordinary cellars at 14-15° C.; (2) under experimental, as opposed to less favourable practical conditions, strawberries picked in dry weather could be kept satisfactorily for 6 days, though raspberries deteriorated more quickly; (3) quality was preserved better in open chip baskets than in chips covered with "transofilm", though loss

of weight was greater. Data for loss of weight and loss of vitamin in storage are tabulated.

2540. ANON.

Electronic eye sorts 240 lemons per minute.

Calif. Citrogr., 1949, 34: 285, illus.

Accurate sizing of lemons is a pre-requisite to mechanical packing, but lemons have so far resisted mechanical sizing because of their irregular shapes. An electronic sorting machine, developed in California, is briefly described in which lemons carried on rollers past an electric eye are sorted into one of five grades, depending on the size of the shadow cast by each fruit. The electronic eye responds to differences that cannot be detected by the human eye. By turning the eye 90 degrees, the machine can sort the already sized groups according to their shapes.

2541. KESSLER, K. L., AND ALLISON, J. R.

Use of growth regulators on lemons in storage.

Calif. Citrogr., 1948, 34: 24-5, 28, illus.

The loss of buttons on lemons and brown discoloration have long been a serious problem in long duration storage of citrus fruits. This is a progress report on experiments begun in 1948 to determine the effect of 2,4-D on lemons in storage. Amongst the conclusions drawn are the following: The proper dosages of 2,4-D, applied at the washer in the packing house have shown an almost complete reduction in the presence of alternaria or internal decline. The dosage range from 100 to 1,000 p.p.m. has a direct influence upon holding the buttons and keeping them green. Above this dosage injury could be expected. The colour of the fruit with normal dosage (100 to 1,000) showed definite improvement. There was some slowing up of colour on the green fruits, however. [From authors' summary.]

2542. MARTH, P. C., AND MITCHELL, J. W.

Apparent antagonistic effects of growth-regulators.

Bot. Gaz., 1949, 110: 514-18, bibl. 2.

Treatment with 2,4-D greatly reduced the effectiveness of chemically prepared ethylene in accelerating the ripening of bananas; the ethylene, however, did not reduce the ripening effect of 2,4-D. A reciprocal antagonistic effect was observed between 2,4-D and the volatile substance produced by bananas during ripening. A complete change of air twice daily of sealed storage containers was found to keep the concentration of this naturally occurring gas sufficiently low to prevent antagonism.—Plant Industry Station, Beltsville, Md.

2543. B[LACKIE], W. J.

Fumigation damage to pineapples.

Agric. J. Dep. Agric. Fiji, 1948, 19: 45-6.

A note on damage to shipments of fresh pineapples through an impurity, or impurities, contained in the commercial carbon bisulphide used in fumigating the fruit.

2544. PAGE, A. B. P., AND LUBATTI, O. F.

Application of fumigants to ships and warehouses. VII. Fumigation of dried fruit with methyl bromide in chambers.

J. Soc. chem. Ind. Lond., 1949, 68: 151-8, bibl. 2.

These are the second and third series of experiments designed to provide safe and efficient fumigation of dried fruit with methyl bromide. Loss due to leakage and absorption in the fabric of the chamber is reduced if bituminous felt sides are replaced by brick walls surfaced with fine sand and cement and a waterproofing agent. Distribution is uniform with close stacking when an efficient method of circulation is used. With forced circulation air-tightness of the chamber is essential. Under the conditions described, one hour's airing is sufficient to permit of unloading. [Authors' abstract.]—Imperial College of Science and Technology.

2545. DENAIFFE, —.

Comportement des pommes de terre après la récolte. (Behaviour of potatoes after harvest.)

Jardins Fr., 1948, 2: 243-4.

The loss of weight occurring in potatoes during storage was found to vary considerably with the variety. For any one variety the loss varies with the time of year, but does not increase progressively. It is higher in garden potatoes, especially the early varieties, than in fodder types.

2546. RICHARDSON, L. T., AND PHILLIPS, W. R.

Low temperature breakdown of potatoes in storage.

Sci. Agric., 1949, 29: 149-66, bibl. 5, illus.

It was found that tubers of certain potato varieties when stored at a temperature just above the freezing point of the tissues developed a physiological disorder which the authors have termed "low temperature breakdown". The symptoms are described. The varieties Katahdin, Chippewa, and Irish Cobbler were very susceptible, Dooley was intermediate, and Green Mountain and Warba highly resistant to this breakdown. Further tests revealed the following points of interest. Tubers packed in moist sphagnum moss were injured less by low temperature storage than unprotected tubers. Tubers of susceptible varieties lost weight excessively at 32° F., but loss of weight in resistant varieties was least at low temperatures. Breakdown appeared in Katahdin tubers after 2 months at 32° F. and after 6 months at 36° F. In Katahdin tubers breakdown is associated with increase in sugar concentrations, but Green Mountain develops even higher concentrations without showing symptoms of breakdown. Tubers affected by breakdown turn black on cooking. Low temperature inhibited or retarded bud development in tubers of susceptible varieties, and these germinated poorly and produced subnormal plants with a low yield. A storage temperature of 36° F. is considered best for most varieties, especially for seed purposes.—Central Experiment Farm, Ottawa.

Plant products.

2547. SKARD, O.

Innholdet av vitamin C i eple og baer. (Vitamin C content of apples and small fruits [in Norway].)

Frukt og Baer, 1949, 2: 22-5.

Data are tabulated for red and black currants, raspberries and a number of apple varieties grown at the Norwegian Agricultural College (latitude 59° 40' N) and at the Horticultural School at Staup (63° 45' N) in 1947

and 1948. Further data are presented for 5 apple varieties from latitudes of 65° 28' N and 66° N relating vitamin C content to fruit size, seed and fruit colour. It was found that in all small fruit and apple varieties tested, with the exception of Transparente blanche, ascorbic acid content increased with latitude. The most marked difference was recorded for the apple varieties Gravenstein and Wealthy, in which cases the vitamin C content rose from 5.7 and 8 mg./100 g. at a latitude of 59° 40' to 27.7 and 24.8 mg. respectively at 63° 45'.

2548. RIKOVSKI, I.

The vitamin C content of some fresh and preserved culinary plants. [Yugoslavian with summaries in Russian and English.]

Yearb. Fac. Agric. For. Univ. Belgrade, 1948, pp. 235-41.

Leaves of sorrel (*Rumex acetosa*), spinach dock (*Rumex patientia*), smooth-fruited dock (*R. longifolius*), turnip (*Brassica rapa*), stinging nettle (*Urtica dioica*), dandelion (*Taraxacum officinale*), dill (*Anethum graveolens*) and parsley (*Petroselinum hortense* var. *sativum*) were examined for their vitamin C content and the results are here recorded. The leaves of spinach dock contain the most (0.74 mg. in 1 g. of the fresh material). Leaves of parsley and dill contain up to 1.5 mg. vitamin C per 1 g. fresh leaves, but they lose nearly 80% of it by drying or salting, retaining, however, their aroma.

2549. STOCKER, O.

Tiroler Sanddorn (*Hippophae rhamnoides* L.) als Vitamin C-Höchstleistungspflanze. (*Hippophae rhamnoides*—an outstanding source of vitamin C.)

Züchter, 1948, 19: 9-13, bibl. 9.

Berries of the shrub *Hippophae rhamnoides* growing in several localities of the Tyrol, Austria, were found to be an exceptionally rich source of natural vitamin C, averaging 835 mg. %. Ascorbic acid content was shown to decrease with size of berry, so that the average value in small berries weighing 100-120 mg. was much higher, viz. 1,300 mg. %. A further relationship exists between berry colour and vitamin C content. Selection, breeding and the planting of high-yielding shrubs in the Alps are considered promising.

2550. LI, L-Y., AND CHOU, C-Y.

The ascorbic acid content of fruits, vegetables and other plant-parts in Fukien. [Chinese, English summary 1½ pp.]

Fukien agric. J., 1948, 10: 1-14, bibl. 13.

Among the fruits examined, the Chinese date, *Zizyphus jujuba*, tops the list with 383-539 mg. ascorbic acid per 100 g. of fresh pulp, followed by Yiu-Kan, *Phyllanthus emblica*, with 283-413 mg., wild rose hips, *Rosa laevigata* and *R. bracteata*, 224-374 mg., and guava, *Psidium guajava*, 125-183 mg. in the skin and 21-57 mg. in the pulp. Lungan, *Euphoria longana*, and hwangpee, *Clausena lansium*, are also rich sources of ascorbic acid. Among the vegetables, pepper, *Capsicum annum*, ranks the highest, red pepper containing 157-176 mg. and the green 74-129 mg. per 100 g. of pulp. Celery, *Apium graveolens*, has 57 mg. in stem and leaf together, and 100 mg. in the leaf. Red and green Chinese spinach, *Amaranthus tricolor*, have 54-71 and 66-79 mg.

respectively, spinach, *Spinacia oleracea*, 62-69 mg., balsam pear, *Momordica charantia*, 68 mg., while brassica, *Brassica oleracea*, has 46-49 mg. per 100 g. of leaf. [From authors' summary.]

2551. EGOROV, I. A.

The B-vitamin content of Georgian tea. [Russian.]

Doklady Akad. Nauk S.S.S.R., 1949, 64: 839-40, bibl. 3.

The thiamin content of 5 kinds of tea and the nicotinic acid content of 4 are tabulated.

2552. ATKINSON, F. E., AND STRACHAN, C. C.

Production of juices. Their manufacture, chemical aspects and laboratory control.

Publ. Canada Dep. Agric. E.F.S. 813, *Tech. Bull.* 68, 1949, pp. 63.

This valuable bulletin, based on recent Canadian and American research and practice, will be welcomed throughout the Commonwealth. [The greatest possible use has been made of it in Technical Communication 21 of this Bureau, now at Press, entitled Recent Advances in Fruit Juice Extraction Methods.]

2553. HOWES, F. N.

Vegetable sources of essential oils.

Research, Lond., 1949, 2: 217-20, bibl. 6.

The source, areas of production, availability and uses of some of the oils which are of special interest at the present time are briefly noted.

2554. ISLIP, H. T.

Essential oils of the British colonies in relation to world supplies.

Bull. imp. Inst. Lond. 19, 1948, 46: 159-79, bibl. 1.

The geographical and botanical origin of 21 essential oils is given and the proportion of the world's supply coming from colonial sources shown, as well as their principal uses and their price range (in 1947). Opinions are expressed on future possibilities. The article refers particularly to East African production.

2555. IGOLEN, G.

Oil of narcissus.

Amer. Perfum., 1948, 52: 327 from *Brit. Abs.*, 1949, BII, p. 235.

An analysis of the oil of wild narcissus flowers grown in Provence.

2556. ISLIP, H. T., AND MAJOR, F.

I. Orange oils from Palestine. II. Grapefruit oil from Palestine.

Bull. imp. Inst. Lond., 1948, 46: 213-15, 215-18, bibl. 5 and 4.

Laboratory reports on samples of (1) sweet orange oil and (2) "Jaf-Ora natural grapefruit oil".

2557. B[RAY], G. T.

Tea seed oil.

Bull. imp. Inst. Lond., 1948, 46: 237-8, bibl. 5.

Tea seed oil of commerce is obtained from the seeds of a tree, *Camellia sasanqua*, which occurs in China, Japan, Indo-China and Assam, and not from the tea bush, *C. sinensis*. Supplies come almost entirely from China, total exports for 1939 being 2,440 tons.

The tree, its requirements and cultivation are briefly described. It comes into bearing in its 6th year and bears for 40 years or more. Yields per tree are given as 18-22 lb. at 8 years, 88 lb. at 15 years, when in full production, and yields per acre approximately 6,400 lb. The seeds constitute about 50% of the fruit by weight, the kernels 70% of the seed, and the oil up to 60% of the kernels. The uses of the oil and its constants are given.

2558. RODRÍGUEZ, C., AND CLAVER, M.
Sobre la presencia de polifenoles en las semillas de algarrobo (*Ceratonía siliqua* L.). (The presence of polyphenols in carob seeds.) [English summary 5 ll.] *An. Inst. Edaf.*, 1949, 8: 59-68, bibl. 21.

The presence of polyphenols in the seed coats of carob beans, and the effect of time and pH on the density of aqueous extracts of the seed are studied. A method of extracting the dyestuff without caramelization occurring is described.

2559. ROELOFSEN, P. A., AND GIESBERGER, G.
Onderzoekingen over cacaobereiding. (Investigations on the curing of cacao.) [English summary 12 pp.] *Arch. Koffiecult. Ned.-Ind.*, 1947, 16: 1-159, bibl. 88.

The results of fundamental and extensive investigations, carried out during 1935-8 on the Siloewok Sawangan Estate in Java. A basic study of the composition and effect of the microflora active at various stages of fermentation, and of the chemical processes involved in curing, is followed by a discussion of the effect of different Javanese curing practices on the final quality. A study of factors affecting aroma showed that the processes responsible for aroma are set in action at the moment of death of the bean and continue during drying as long as the water content does not fall below a certain value. The aroma is improved by "repeated fermentation" (i.e. submersion of dried cacao). The quality of second grade plantation cacao can be greatly improved by fermenting in thin layers, and by submersion for a few minutes in 52% H_2SO_4 . If the unripe beans, or "rampasan-cacao", collected at the end of the harvest, are sun-dried for a week after picking, the fermentation process can follow a nearly normal course. An explanation is given of the unfermented purple and white patches on beans, and the occurrence of wrinkling; both can be largely avoided by "repeated fermentation". Finally, the storage of cured cacao under Javanese conditions is discussed.

2560. GOPALAN, K.
Desiccated coconut industry.
Indian Fmg, 1947, 8: 338-41.

A description, based largely on Ceylon methods, of the manufacturing process, the machinery used, the by-products (paring- and sediment-oil), and packing. There is a note on the possibility of manufacturing desiccated coconut in India.

2561. HUME, E. P.
Coir dust or cocopeat—a byproduct of the coconut.
Econ. Bot., 1949, 3: 42-5, bibl. 6, illus.

Coir dust can be produced in large quantities as a by-product in the processing of coconut fibre. In preliminary tests made at the Federal Experiment Station, Puerto Rico, it has been found possible to make successful use of this material in much the same way as horticultural peat, namely, as a medium for seed sowing and rooting, and for mulching. The growth of seedlings watered with the soluble extract of coir dust was stimulated.

2562. EDWARDS, M. G.
Extraction of undried pyrethrum flowers.
Fifth A.R. E. Afr. industr. Res. Bd 1947, 1949, pp. 8-12.

An account is given of experiments using various solvents and methods for extracting pyrethrin from undried flowers. Results indicate that the extraction of undried flowers compares favourably with the existing methods using dried flowers and merits large-scale trials.

2563. ANON.
Non-power burner designed for the combustion of furnace oil [in tobacco curing barns].
Plant. Chron., 1949, 44: 191-2.

A note on a drip type oil burner which will operate on a minimum of 20 oz. oil per hour and a maximum of about 3 gal. With it, temperatures within a barn can be kept within 2° of any desired figure from 90° to 160/170° F. A ratio of 1:4 oil to coal was found possible. A plan of the design is offered on loan.

2564. BENNETT, R. R., AND HAWKS, S. N.
Curing bright leaf tobacco.
Ext. Circ. N.C. agric. Ext. Ser. 332, 1949, pp. 11, illus.

Advice is given on improving the insulation and ventilation of curing barns and on the need for harvesting only uniformly ripe leaf, and spacing it properly in the barn. Suggestions are made for maintaining proper conditions during the curing process.

2565. MOSSOP, M. C.
DDT for tobacco warehouses and store-rooms.
Rhod. agric. J., 1949, 46: 73-8, bibl. 3.

The application of residual sprays depositing about 350 milligrams of the *para-para* isomer of DDT per square foot on walls and other surfaces is advocated, i.e. a light spraying using 2 lb. of commercial 50% DDT wettable powder in 1 gal. of water per 1,000 sq. ft. of surface. Where tobacco is stored more or less continuously, applications every two or three months from spring (September) to early winter are advised. Applications should precede general cleaning operations rather than follow them.

2566. MERRITT, R. P., AND MITCHELL, W.
Pyrethrum dispersion with the Todd insecticidal fog applicator.
Pyreth. Post, 1948, 1: 1: 15-16.

A brief outline of the principles of this machine, Tifa, which disperses liquid insecticides in the form of a dense fog of fine particles which can be graduated over the range 0.5 to 60 μ and treat 15,000 cu. ft. per minute. The machine should be eminently suitable for use in tobacco and other warehouses.

2567. CHITTENDEN, A. E., AND COOMBER, H. E.
Banana fibre from Jamaica. Suitability as
a paper-making material.

Bull. imp. Inst. Lond., 1948, **46**: 218-23.

A report on two samples, one from the variety Gros Michel and the other from *Musa balbisiana* var. *brachycarpa*. It is concluded that it is possible to produce only very moderate yields of soda pulp under reasonable conditions of digestion. The pulps could be bleached economically but with a fairly high bleaching loss. It is difficult to say for what purpose they could be used commercially.

2568. LEUBUSCHER, C.

The processing of sisal and the manufacture of sisal goods.

Bull. imp. Inst. Lond., 1948, **46**: 137-58, bibl. 36.

A study, the object of which has been to show what factors are responsible for the present organization of the industries processing sisal and the prospects for changes in the location of these industries.

2569. CHITTENDEN, A. E., AND COOMBER, H. E.
Castor stems from Ceylon.

Bull. imp. Inst. Lond., 1948, **46**: 223-7.

A report on their suitability for paper-making. A weak, ratty paper with a short tear can be produced from these stems suitable only as a filler for longer fibred pulps.

2570. DE HAAN-HOMANS, AND VAN GILS, G. E.
De bereiding van rubber in centrale fabrieken. Moelijkheden en mogelijkheden. (Preparation of rubber in central factories. Problems and possibilities.)

Bergcultures, 1949, **18**: 175-81.

Some of the technical difficulties involved in centralizing the rubber preparation industry are discussed, in particular the problems of latex transport and of keeping the latex in good condition for several hours longer than usual. The advantages of central production include the possibility of using modern methods for the preparation of uniform rubber and special rubbers.—Indonesisch Instituut voor Rubberonderzoek.

2571. INDONESISCH INSTITUUT VOOR RUBBERONDERZOEK.

Cassava-water als een coagulant voor Hevea-latex. (Cassava water as a coagulant for hevea latex.)

Landbouw, 1949, **21**: 68-70.

Directions for the use of cassava root extract as a coagulant for hevea latex, that were first published by the Rubber Research Institute of Malaya in 1946. This method will only be of practical value while the normal coagulants are in short supply.

2572. ALLEN, P. J., AND EMERSON, R.
Guayule rubber, microbiological improvement by shrub retting.

Industr. Engng Chem., 1949, **41**: 346-65, bibl. 24.

The quality of rubber from guayule shrub may be markedly and consistently improved by retting the shrub prior to milling. The improvement is caused by micro-organisms, and its success therefore depends upon the provision of conditions which favour the

rapid development of an active microbial flora, which may include moulds, bacteria, or actinomycetes. Practical methods for attaining favourable conditions have been devised and tested, and their applicability to commercial operation is indicated. Evidence is presented indicating that micro-organisms bring about improved physical properties through selective removal of deleterious resinous contaminants. [From authors' summary.]

Noted.

- 2573.

- a BRANDON, T. W.

Treatment and disposal of waste waters from processing of coffee.

E. Afr. agric. J., 1949, **14**: 179-86, bibl. 1, illus.

- b CARTER, C. L., AND HEAZLEWOOD, W. V.
The essential oil of *Pittosporum eugenoides*.

J. Soc. chem. Ind. Lond., 1949, **68**: 34-6, bibl. 9.

- c DEJIS, W. B.

Kinetische onderzoekingen over de ontleding van waterstofperoxyde door thee-katalase. (Kinetical studies on the decomposition of hydrogen peroxide by tea-catalase.) [English summary 1½ pp.]
Arch. Theecult. Ned.-Ind., 1949, **16**: 71-81, bibl. 6.

- d DEXTER, S. T.

A modified wet- and dry-bulb thermometer technique for determining the moisture content or storage qualities of so-called dry materials.

Quart. Bull. Mich. agric. Exp. Stat., 1949, **31**: 275-86, bibl. 6.

Including white beans.

- e DOESBURG, J. J.

De remmende werking van oxalaten op de oxydatie van ascorbinezuur in verband met de bruine verkleuringen in vruchtenproducten. (The inhibition of the oxidation of ascorbic acid by oxalates in relation to the brown discoloration in fruit products.) [English summary ½ p.]

Meded. Dir. Tuinb., 1949, **12**: 150-63, bibl. 11.

- f FORSYTH, W. G. C.

A method for studying the chemistry of cacao fermentation.

Nature, 1949, **164**: 25-6, bibl. 17.

- g GAYLORD, F. C., AND OTHERS.

Packaging fruits and vegetables: cost, palatability and consumer acceptance [in Indiana].

S.B. Purdue agric. Exp. Stat. **530**, 1948, pp. 24, illus.

- h GATTEFOSSÉ, R. M.

French lavender. Production and economics.

Perfum. essent. Oil Rec., 1948, **39**: 318-19 (*Brit. Abs.*, 1949, BII, p. 235).

- i GUENTHER, E., AND LANGENAU, E. E.

Essential oils and related products.

Analyt. Chem., 1949, **21**: 202-7, bibl. 115.

- j HAAGEN-SMIT, A. J.
Essential oils—a brief survey of their chemistry and production in the United States.
Econ. Bot., 1949, 3: 71-83, bibl. 13, illus.
- k HARDENBURG, E. V.
Effect of types of container, storage and variety on shrinkage of stored potatoes.
Amer. Potato J., 1949, 26: 75-9, bibl. 1, being *Pap. Dep. Veg. Crops, Cornell Univ.* 313.
- l KING, H.
Curare alkaloids. Part VIII. Examination of commercial curare, *Chondrodendron tomentosum* R and P and *Anomospermum grandifolium* Eichl.
J. chem. Soc. Lond., 1948, pp. 1945-9.
- m KING, H.
Curare alkaloids. Part IX. Examination of some *Strychnos* species from British Guiana: characterisation of diaboline, an alkaloid from *Strychnos diabolii*, Sandwith.
J. chem. Soc. Lond., 1949, pp. 955-9.
- n LEGAULT, R. R., AND OTHERS.
Tartrates from grape wastes. Use of anion exchangers in a chloride-tartrate cycle.
Industr. Engng Chem., 1949, 41: 466-71, bibl. 7.
- o MAHANT, S. D., AND PANDIT, P. N.
By-products of the tobacco industry. II. Tobacco dust, scrap, mid-ribs, stalks, etc.
J. sci. industr. Res. India, 1948, 7A: 362-3 from *Brit. Abs.*, 1949, IIB, p. 95.
- p MARTIN, D.
Australian fruit in U.K.
Fruit World, Melbourne, 1948, 49: 12: 13. Chiefly packing problems.
- q NUTTING, G. C., AND WHITTENBERGER, R. T.
Potato storage: effect on the paste viscosity of the starch.
Amer. Potato J., 1949, 26: 121-6, bibl. 7.
- r OSWIN, C. R.
Protective wrappings.
Chem. Industr., 1949, pp. 183-7, bibl. 18.
- s PAGE, A. B. P., LUBATTI, O. F., AND RUSSELL, J.
Application of fumigants to ships and warehouses. VI. Fumigation of dried fruit with methyl bromide in chambers.
J. Soc. chem. Ind. Lond., 1949, 68: 102-8, bibl. 11.
- t POTTER, C.
The development of pyrethrum-oil sprays for the control of insect pests of stored products.
Pyreth. Post, 1948, 1: 2: 5-7.
- u ROUSSEAU, M.
Principales variétés d'abricotier étudiées en Tunisie: compte-rendu d'essais de séchage. (Principal apricot varieties tested in Tunis: report on drying tests (1941-42).)
Ann. Serv. bot. agron. Tunis, 1946, 19: 127-36, bibl. 3 [received 1948].
- v SONDHEIMER, E., AND LEE, F. A.
Color change of strawberry anthocyanin with d-glucose [prior to freezing].
Science, 1949, 109: 331.
- w SREERANGACHAR, H. B.
Studies on the fermentation of Ceylon tea. 8. Further observations on the relationship of tea fermentation to normal respiration.
Biochem. J., 1949, 44: 23-7, bibl. 14.
- x TREADWAY, R. H., WALSH, M. D., AND OSBORNE, M. F.
Effects of storage on starch and sugars contents of Maine potatoes.
Amer. Potato J., 1949, 26: 33-44, bibl. 14.
- y WINSTON, J. R., MECKSTROTH, G. A., AND ROBERTS, G. L.
2-amino-pyridine, a promising inhibitor of decay in oranges.
Proc. Fla. St. hort. Soc. 60th annu. Meet. 1947, pp. 68-77.

NOTES ON BOOKS, REPORTS AND NEW PUBLICATIONS.

2574. ACERETE, A.
Cria de frutales. (Fruit tree raising.)
Estación Experimental de Aula Dei, 1949, pp. 341, bibl. 212, illus., 70 pesetas.

With an admirable thoroughness and clarity the author has assembled and summarized the scattered information on fruit tree raising from all parts of the world. After a discussion of the principles and advantages of grafting, he deals with the methods of raising rootstocks from seed and by vegetative propagation, and describes in detail the methods of stooling, layering and propagation by cuttings developed at East Malling. The technique of budding and grafting, symptoms of incompatibility, stock-scion influence, and the business of running a fruit tree nursery are dealt with in sufficient practical detail to be of real value to the grower. The second half of the book is devoted to the special problems and practices involved in raising trees of various species (avocado, apricot, almond,

cherry, plum, citrus, apple, peach, walnut, pear and others) in Spain and other parts of the world, with numerous references to English work on the subject. The object of the book is to present to the Spanish fruitgrower and student of pomology the most up-to-date information on the subject, and to educate them to the value of good nursery practice. The need for such a book is apparent in the references made to the nursery and fruitgrowing practices current in Spain to-day. The bibliography, to which frequent reference is made in the text, is extensive, and will considerably increase the value of the book for the student.

2575. CHEVALIER, C.
Plantes bulbeuses et tubéreuses. (Bulbs and tuberous plants.)
Maison Desoer, Liège, 1948, pp. 319, bibl. 24, illus., 100 fr. belges.

The way in which the author, editor of the *Bulletin*

Horticole and former director of l'Ecole d'Horticulture de Liège, has condensed so much detailed information into a form so manageable and concise, yet easy to read, evokes real admiration. The book is divided into two distinct sections. The first deals with the morphology of bulbs and tubers, general methods of culture, propagation and pests and diseases. It also contains a very pleasant chapter, written with obvious enjoyment, about the various ways bulbs may be used in garden design. The second part classifies and describes the species, and gives more detailed cultural notes for the individual plants. Great care has been given to the problem of nomenclature. The range of plants dealt with has purposely not been strictly limited by the title, the rhizomatous lily-of-the-valley, for instance, being given the honour due to its decorative and commercial value. Although most space is devoted to the widely-grown species, and commercial practices such as the pre-treatment of narcissi for forcing are dealt with, notes have also been included on the culture of more rare plants that will be of interest to the collector and amateur. Indeed, the book is perhaps primarily of interest to the amateur craftsman, with money to spend and land to play with. The production is good, in spite of the doubtfully artistic illustrations and the inevitable paper cover. P.R.-D.

2576. DAWSON, R. B.

Practical lawncraft.

Crosby Lockwood, Lond., revised 1949, pp. 315, bibl. 16, illus., 15s.

The only quickly noticeable additions to this new edition are the two very useful appendices on selective weed killers (2,4-dichlorophenoxyacetic acid and 2-methyl-4-chlorophenoxyacetic acid) and on leather jacket control with DDT and "Gammexane". Otherwise the book remains, as before, indispensable to all connected with the establishment or maintenance of lawns for pleasure and for all forms of sport. Even the man with a patch of grass a few yards square could benefit by reading its contents. The author, though primarily concerned with English conditions, devotes some 20 pages to turf upkeep in the following countries: Canada, New Zealand, Australia, Malaya, Egypt, India, South Africa, Europe, China and Japan, and the U.S.A.

2577. DOREY, O. G.

The fruit farm.

Faber & Faber, London, 1949, pp. 102, illus., 15s.

The author deals with the cost of planting a 60-acre fruit farm in Essex and the accurate costings from 1936/37 to 1943/44 presented cover all the operations from preparing the ground for planting to picking, storing and marketing the crop. Since the costs of labour, machinery and materials are all given separately, it is possible to calculate what the same operations would cost at present prices. Every point in planning is considered very carefully and, what is more, comment is made later of the suitability or otherwise of the relevant decisions taken. This should be invaluable to the fruit grower, especially to the novice. Particulars are given of the actual records taken, of methods of planting and protecting the trees and routine cultural operations including spraying. An appendix

lists all tools bought. Among the many books published recently which intimately concern the fruit grower, this takes a very high place. It is, moreover, worth careful study by the research worker, who all too often has little idea of the costs of the operations with which he is concerned. D.A.

2578. GERARD, G.

Electricity for farmers.

The Technical Press Ltd., Kingston Hill, Surrey, 1949, pp. 111, illus., 6s.

This clearly written small book is more for the general farmer than the horticulturist. Thus, although there is much information on care of the electric plant, its use in the farm house, on the poultry farm and in the dairy, the application of electricity to spraying, hot bed or glasshouse work is not discussed. D.A.

2579. HARDENBERG, E. V.

Potato production.

Comstock Publ. Co., Ithaca, N.Y., 1949, pp. 270, illus., \$3.

The potato has indeed come into its own. A year ago we were reviewing Burton's physiological survey [*H.A.*, 18: 3091] of the potato as a source of food. Since then Salaman's monumental work, the history and social influence of the potato [Cambridge Univ. Press, London, 50s.] has appeared, and now Professor Hardenberg gives us the latest from the U.S.A. Hardenberg's book, though primarily for college instructional work and therefore amply documented for further study, will have a big appeal for the practical man on both sides of the Atlantic. But though cultural practices are similar, it may be noted that not one of the 37 potato varieties described by Burton occurs in Hardenberg's list of 26 varieties.

In dealing with pests and diseases Hardenberg does not pay so much attention to viruses as the English author. He recommends DDT for all insects except aphides, against which he notes the promising effects of parathion. A useful discussion is included of different tuber defects classified according to whether their cause is animal pest, disease, insect pest, mechanical agent, miscellaneous factors such as fertilizer damage, or physiological. Having himself investigated harvesting methods, the author discusses the merits of different machines. In the south much of the harvesting is done by cheap hand labour. Storage, grading, bagging and marketing are considered, and in the last 3 chapters quality and utilization, breeding and improvement, and, finally, the economics of production from the point of view of the individual grower. D.A.

2580. HOARE, A. H.

Commercial apple growing.

Bodley Head, London, 2nd edition, 1949, pp. 288, bibl. 33, illus., 12s. 6d.

This second edition of a well-known book follows the same lines as the first (*H.A.*, 7: 1106), which has been thoroughly revised. The chief additions are two new chapters dealing with "fertility and pollination" and rootstocks under the title "the apple tree as a propagated plant". These chapters enlarge on material previously incorporated as small sections in other chapters. Less obvious additions include a useful list of varieties grown in other countries with information on total acreages and average yields, and a note on

prevailing conditions as affecting marketing. The pruning chapter has been brought up to date to some extent by a section devoted to general observations, but this subject is still dealt with too superficially to be of much help to the practical grower. Whether growers should be encouraged to conduct manurial experiments in their orchards as suggested by the author, instead of relying on soil analysis and observation of tree growth, is questionable. The chapter of pests and diseases has not been so well revised as that on control measures; thus, in the first of these, petroleum oil and nicotine are the only controls given for apple capsid, whereas DDT is rightly given as an effective control for this pest in the chapter on control measures. Further, one cannot help wondering whether the simple bird scaring device described, 6-10 strips of bright metal per acre, is really effective. The revised personal note at the end of the book unfortunately omits to give any figures under the heading "what returns should I expect?", and one wonders if the costings on p. 273 have been sufficiently adjusted to suit modern conditions. The book is compact and pleasantly produced, though the paper is of somewhat inferior quality, and pages tend to come loose, at least in the reviewer's copy. The illustrations are clear and generally helpful. Printer's errors are few, but include one good specimen, namely "The application of deficiencies" in the table of contents under Chapter VII. Despite these few criticisms the new edition is a worthy successor to the first and should prove a valuable companion to modern pomological works on the practical grower's shelves.

H.B.S.M.

2581. JOHN INNES HORTICULTURAL INSTITUTION [DARLINGTON, C. D., editor].
The fruit, the seed and the soil.
Collected John Innes Leaflets, 2nd edition, 1949, pp. 90, 3s. 6d.

Three new leaflets have been added since the first appearance of this collection in 1948, namely No. 4, Raising plants in soil blocks; No. 8, Sweet corn in England; and No. 9, Making new plants: the colchicine method [for which see abstracts 1733 and 1735].

2582. LAWRENCE, W. J. C.

Better glasshouse crops.

George Allen & Unwin, Lond., 1949, pp. 57, bibl. 3, 5s.

This small book consists of articles which originally appeared in *The Grower*. The writer, who is head of the garden department of the John Innes Horticultural Institution, bases them on the practical experimental work at that centre which has so greatly benefited glasshouse growers throughout the country. He takes nothing on hearsay evidence and proposes no "lucky dips". The amateur and professional grower should be equally grateful for the help afforded on the following subjects: choice and preparation of loam, soil sterilization, seed and potting composts, the sterilizing and mixing shed, use of right compost, transplanting, tomato raising, lettuce raising.

D.A.

2583. MITCHELL, A. D.

British chemical nomenclature.

E. Arnold & Co., London, 1948, pp. 156, 21s.

Dealing with both inorganic and organic nomenclature,

the author "aims at a statement of the conventions adopted in the *Journal of the Chemical Society*".

2584. NIJDAM, J.

Woordenlijst in vier talen op het gebied van tuinbouw en plantkunde. (Dictionary of horticultural terms in Dutch, German, English and French.)

Minist. Landbouw, Visscherij en Voedselvoorziening, Dir. van Landbouw, 1945, pp. 97, fl. 3 [received 1949].

Attention is drawn to this useful Dutch publication, which should greatly help the horticulturist struggling with foreign terms. It consists of 4 sections in each of which the initial words are in one of the languages named.

2585. NORSKE HAGESKAP.

Frukt og baer. (Top and small fruit.)

Årsskr. Norske Hageselskap, Oslo, 1949, Vol. 2, pp. 214, Kr. 4.

The fruit year book of the Norwegian horticultural society for 1949 is the second in the series. It contains both review articles presenting to the Norwegian grower the progress in pomological research generally, statistics of fruit trees in Norway in 1946, and original papers on fruit growing problems [abstracted elsewhere in this number].

2586. PLANT PROTECTION LTD.

Fruitgrowing for amateurs.

Plant Protection, 61 Curzon St., London, W.1, 1949, pp. 128, illus, 8s. 6d.

This unpretentious book has many merits including brevity and clarity of expression, and clear, if somewhat diagrammatic, coloured illustrations. It does not go into the detail or technique of the operations advised but indicates the general lines to be followed by those about to plant up their gardens with fruit trees. Considerably more space is devoted to apples than to any other fruit. Control measures are indicated for the most common pests and diseases. It is written for the amateur, and the amateur should find it useful and suggestive.

D.A.

2587. RIJKSTUINBOUWVOORLICHTINGSDIENST.

Tuinbouwgids 1949. (Horticultural guide to the Netherlands for 1949.)

The Hague, Holland, 1948, pp. 1024, illus, fl. 4.

This 1949 edition of *Tuinbouwgids* is again a compendium of information for the grower. In addition to particulars of the numerous institutions, societies and publications at the service of the horticulturist, there are comprehensive tables of pest and disease control substances in vegetable, fruit, bulb and tree culture, a classification of insecticides and fungicides with directions for their use, and a detailed chart of growth substances used in the propagation of shrubs, showing times and methods of application. The articles cover a wide range. First class practical information is given on subjects such as boilerhouse construction, the heating of a bulb store, fruit packing and harvesting of vegetable seeds. The important points of onion, plum, mushroom and tobacco culture are discussed by experts, and recent findings of research on hormone spraying of tomatoes, grafting of cucumbers on to wilt-resistant stock, and pre-treatment of tulip bulbs in store are summarized.

2588. STAPLEY, J. H.

Pests of farm crops.

Farmer & Stock-Breeder Ltd., E. & F. N.
Spon Ltd., Lond., 1949, pp. 325, illus.,
£1 1s.

Books relating to agricultural entomology are not numerous, and, therefore, *Pests of Farm Crops* is a welcome addition to the list, not only because it will prove very helpful to farmers, but because it should be of value to the technical district officers of the Advisory Service as well. After the introduction there follows a summary of pests classified under crops. This will be particularly helpful to the practical grower, since all the pests concerned with a particular crop are tabulated together under the crop, the name of the pest being followed by a description of damage, time of occurrence and, finally, a page reference to the pest in question. Chapter I deals with pests in relation to farm crops and is summarized under such headings as Biological Equilibrium, Weeds and Hygiene, Pest Resistance in Plants, etc. Chapter II deals with the insects affecting farm crops and covers some 230 pages. The classification of insects is briefly referred to, but one wonders whether this is necessary in a book of this nature, since dozens of good textbooks on this subject are already available. The main part of this chapter is arranged under the insects, e.g. aphids found on cereals and grasses, and aphids found on potatoes. The most useful information occurs under the heading of "Practical Considerations", and the suggestions here outlined will be read with interest by all concerned with the control of farm pests. Chapters III and IV relate to spiders, mites, ticks, millipedes and centipedes, but these very important creatures are dismissed in eight pages. Chapter VI discusses the slugs, and finally in Chapter VII the eelworms are mentioned, in some detail. The book is interspersed with tables, and a good series of photographs of farm crops rounds it off. It is a pity, however, that more of the important pests are not figured, since one has the feeling that the practical grower would prefer illustrations of pests to those of plants. The subject is difficult to present in a practical manner, and the writer is to be congratulated on his concise form and readable text. A.M.M.

2589. TIDBURY, G. E.

The clove tree.

Crosby Lockwood, Lond., 1949, pp. 212,
illus., 18s.

This well-illustrated book can claim to be the only work of its kind which is devoted entirely to the clove tree, whence comes that fragrant and versatile product clove oil, which serves as antiseptic, antiputrescent, rubefacient, carminative, and clearing agent, also as a flavouring for confectionery and tobacco—not to mention its more homely uses in relieving toothache and morning sickness. It is appropriate that this book, written by a practical agriculturist, should hail from Zanzibar which supplies over three-quarters of the world demand for cloves, put at 12,000 tons per annum. The author first traces the history of the clove trade from its beginnings, gives the geographical distribution of the crop, its soil and climatic requirements, and an account of its botany. Then follow four practical chapters on the agronomy of the crop. These will be

particularly valuable to the grower since they deal, at some length, with nursery technique, the establishment and care of plantations, and the harvesting and curing of the crop. Much of the information in these four chapters has been obtained from the unpublished records of the Zanzibar Department of Agriculture and is not to be found elsewhere. In the chapter on diseases and pests, first place is very properly given to the still mysterious disease known, for want of a better term, as "sudden death". Despite the considerable amount of attention that has been given to it, the disease has so far defied all attempts to discover its origin. Although published in 1949, this chapter on diseases is not up to date since it makes no reference to the special Clove Research Scheme started in 1947 and financed by the British Government (vide *A.R. Dep. Agric. Zanzibar 1947*). The last four chapters are given over to costs of production, statistics (census, canopy survey and valuation), notes on legislation in Zanzibar and elsewhere concerning cloves, and finally a list of some of the many uses for the clove and its products. There is a useful bibliography of 34 items. One hopes that the appearance of this useful book will inspire other agricultural officers in the tropics to write similar monographs on their own particular crops—and may their illustrations be as good as those in this book, most of them from photographs by F. B. Wilson! A.G.G.H.

2590. WAKSMAN, S. A.

Microbial antagonisms and antibiotic substances.

The Commonwealth Fund, New York, 2nd edition, 1947, pp. 415, bibl. 1,053, illus., 22s.

Although this book has little direct application to horticulture it includes, and describes at some length, certain complex, antagonistic reactions between soil organisms, reactions that induce changes in the soil population and so affect soil fertility. Such processes cannot be ignored by those who are interested in plant growth, and here the horticulturist will find indicated the work that has been done on these and other aspects of biological antagonism among bacteria, actinomycetes, fungi and microscopic animals. One chapter deals also with "Antagonistic relationships between micro-organisms, viruses and other nonspecific pathogenic forms". The chief popular interest to-day in microbial antagonism is the antibiotic action of such substances as penicillin in relation to their chemotherapeutic properties, as discussed in Chapter 12. One effect of antagonism in the soil is described in Chapter 13 under the title of "Microbiological control of soil-borne plant diseases" where it is shown that soil-inhabiting micro-organisms are sometimes antagonistic to plant pathogens. Among the examples quoted are some of horticultural significance. Thus *Phytophthora cactorum*, the cause of a crown rot of apple trees in Canada, is inhibited in rotted tissues by the antagonistic action of secondary organisms; various actinomycetes are antagonistic to a species of *Pythium* which is parasitic on sugar-cane roots; a watermelon disease caused by *Phymatotrichum omnivorum* was reduced when certain fungi and bacteria were present in the soil together with the pathogen; certain soil inhabitants inhibit the growth of the potato scab organism, referred

to (p. 307) as *S. scabies* but which should be *Actinomyces scabies*; and *Phytomonas tumefaciens*, the cause of crown gall in plants, is stated (p. 303) to be controlled by crude penicillin, but the reference given is to an article in which penicillin was shown to suppress the cactus plant pathogen, *Erwinia carnegieana*. These two slips, found at random, in no way detract from the argument and will doubtless be corrected in a further edition. That the book is in much demand is shown by this being the second edition, revised and enlarged, the first being published as recently as March, 1945, with a second printing in December of that year. The subject is one that has been considered of paramount importance in recent years, as indicated by the copious references in the bibliography, most of them dated since 1940. H.W.

2591. WESTON, W. A. R. DILLON, AND STAPLEY, J. H.
Diseases and pests of vegetables.
Longmans, Green & Co., London, 1949,
pp. 74, illus., 4s.

After an introductory chapter on vegetable growing in relation to the general control of pests and diseases, this book gives detailed descriptions of 16 diseases and 16 pests of vegetables with measures for dealing with them. The vegetables concerned are asparagus, cabbage and related plants, carrots, celery, lettuce, onions, potatoes and tomatoes. It is illustrated by 32 sets of drawings to show the general appearance of affected plants and the life histories of the causal organisms. Amateur gardeners and nurserymen will find this a handy and useful book. H.W.

2592. AMANI.
Report of the East African Agricultural Research Institute, Amani, for 1947.
H.M. Stationery Office, London, 1949,
pp. 12, 6d.

In the 1946 report (see H.A., 17: 2777) it was stated that it would be the last annual report of this institute. Owing, however, to delay in the formal absorption of the institute into the new East African Agricultural and Forestry Research Organization, it has been necessary to publish a report for 1947. Four short reports on soil science, systematic botany, plant pathology, and plant physiology appear as appendices.

2593. AMERICAN POMOLOGICAL SOCIETY.
Proceedings of the 62nd Convention of the American Pomological Society, St. Louis, 1948, pp. 212.

This Convention, which celebrated the 100th anniversary of the American Pomological Society, was known as the Centennial Fruit Congress. Historical surveys of the development of the fruit and allied industries in the United States marked the occasion. [Abstracts of papers on topical subjects will be found in this number.]

2594. BANGA, O., AND OTHERS.
Algemene veredelingsdagen 1948: verslag van voordrachten en discussies. (Horticultural plant breeding days, 1948: report of addresses and discussions.) [English summaries.]
Meded. Inst. Vered. Wageningen 11, 1948, pp. 88.

This report consists of papers read at the third conference of the Institute of Horticultural Plant Breeding, Wageningen. It includes papers in Dutch with English summaries on the following subjects:—

1. The present position concerning the protection of breeders' rights:—i. the scope of the plant breeder's decree, 1941; ii. control of the propagation of fruit tree varieties difficult to identify in the nursery; iii. the possibility of protection by applying the Danish system for non-determinable varieties of vegetable crops.
2. Factors to be considered in the breeding of fruit and vegetable varieties suitable for cold storage, preservation or freezing:—i. storage and cold storage; ii. processing.

2595. BARBADOS.
Annual Report, Department of Science and Agriculture, Barbados, 1947-48, Bridgetown, pp. 84.

Sugar-cane breeding: Details of crosses made and seedlings raised during the year are followed by reports on the performance of seedling varieties bred in previous years. In the high and intermediate rainfall areas, B.41211 and B.41227 have proved to be as good as, or better than, the standard varieties B.37161 and B.4098, while B.34104 has been outclassed by all four. B.41211 has the advantage of arrowing sparingly, even in the more elevated parts of the Island. *Chemistry*: Soil investigations and manurial trials with sugar-cane are reported. *Entomology*: The main pest of sugar-cane, *Diatraea saccharalis*, continued to be kept under control, but the root borer, *Diaprepes abbreviatus*, is on the increase. Predators of the scale insect, *Aspidiotus destructor*, were introduced through the Trinidad branch of the Commonwealth Bureau of Biological Control. *Plant diseases*: The campaign for eliminating mosaic disease of sugar-cane continued.

2596. BELGRADE UNIVERSITY.
Yearbook of the Faculty of Agriculture and Forestry, Belgrade, 1948, [No. 1], pp. 371.

The Faculty of Agriculture and Forestry of the University of Belgrade announce the regular publication of their Yearbook starting with the present number, and wish to exchange publications with other scientific institutions. This number consists of 18 papers on various subjects [for four of which see 1808, 1811, 2009, 2548]. Each article has a summary in Russian and usually also in French or less often in English.

2597. BRITISH COLUMBIA.
Forty-third Annual Report of the Department of Agriculture, B.C., 1948, 1949, pp. 228.

Horticulture: (pp. 60-89). Work is reported on: selective herbicides for flowers and vegetable crops; glasshouse tomato trials; red stele of strawberry; apple scab control; coryneum blight on peaches and apricots; control of powdery mildew, codling moth, buffalo tree-hopper, red mite, San José scale, and peach twig-borer; the successful use of various kinds of mulch for soft fruits.

2598. BUREAU OF SUGAR CANE EXPERIMENT STATIONS, QUEENSLAND.
48th Annual Report of the Bureau of Sugar Experiment Stations, Queensland, 1948, pp. 48.

The report of the director, from which the items noted below are taken, is followed by reports from the divisions of soil and agriculture, entomology and pathology, and mill technology. A large programme of field experiments was carried out. The results of fertility surveys indicate that the plant food status of many soils is still low. Liming trials showed that much effort and fertilizer are being wasted in attempts to grow cane on soils which are too acid. The outstanding result in fertilizer trials was the demonstration of the need for a correct balance between N and K. The search for better green manure legumes continued. Reeve's cowpea selection Q.1582 has proved highly successful as a green manure crop in some districts. In trials of hormone type herbicides, particular attention was paid to nutgrass (*Cyperus rotundus*). The "cane-killing weed" *Striga* sp., can be killed, above and below ground, by a single application of a hormone spray at the rate of 1 lb. of active ingredient per acre. Cane breeding experience has shown that seedling selection plots should be established in all important sugar-cane areas so as to obtain varieties suited to local conditions. The treatment of cane setts with mercurial fungicides before planting has given excellent results in many areas. An unexplained result of such treatment is the observed stimulus to root and shoot growth, as distinct from the protection from fungus attack. The successful destruction of white grubs by gammexane will undoubtedly lead to its use on a larger area. Another advance is in the application of a gammexane-fertilizer mixture in the drill at planting time to control wireworms.

2599. CANADA.

Report of the Ministry of Agriculture, Dominion of Canada, for the year ending March 31, 1948, pp. 245, 50 cents.

The greater part of this comprehensive report is devoted to the science and experimental farms services. The rest is concerned with the organization of the Department of Agriculture, the 1947 crop season, new legislation, and the production, marketing, and administration services. The following projects are reported by the *Division of Horticulture* (pp. 142-50): the selection of hardy rootstocks for apples from Russian seedling material, apple rootstock trials with Malling clones, double working of apples to reduce winter injury, fruit thinning by chemicals, fruit breeding, orchard management investigations, fertilizer studies with vegetables, cultural treatment of raspberries, black-end disease of pears, vegetable seed production, plant breeding (sweet corn, potatoes, and ornamental shrubs), investigations into shipping cut blooms of spring bulb flowers, fruit and vegetable processing and storage. *Tobacco* (pp. 163-72): Work is reported on breeding and selection; new flue-cured Burley, dark, and cigar varieties; seed-bed treatments; soil and cropping systems; manurial experiments. *Weeds* (pp. 176-8): Work on the chemical control of weeds in vegetables using 2,4-D, Sinox, cyanamid, and oil is briefly reported.

2600. COLORADO.

61st Annual Report of the Colorado Agricultural Experiment Station, 1947-48, Fort Collins, pp. 39 [received 1949].

Potatoes: In a study of the fundamental action of 2,4-D compounds these were found to improve cooking

qualities in two potato varieties. Some results from manurial and insecticidal trials are reported. The possibility of using ultra-violet light as a means of detecting and identifying mosaic, leafroll, and spindle-tuber was studied. *Cherries*: Little Cherry, a new virus disease in the U.S.A., has been found. The indications are that it is caused by the same virus responsible for X-disease in peaches. *Apples*: Experiments using DDT and DN 111 for controlling codling moth and mites are reported. *Weed control*: Recent developments include the use of herbicides in small volumes (1 to 5 gal. per acre), a practice which was first developed in connexion with spraying from aeroplanes. Results from the use of 2,4-D on various weeds are reported. In laboratory tests, ultra-violet light has been found to increase the activity of several 2,4-D compounds.

2601. McDONALD, J. [CYPRUS DEPARTMENT OF AGRICULTURE].

Investigations and developments in Cyprus agriculture 1938-48.

Cyprus Government Printing Office, Nicosia, 1949, pp. 56, bibl. 11, 5s.

This record gives a fuller account of the activities of the Department of Agriculture than that already published in its annual reports. Accounts of the following developments and investigations are included. *Seeds*: the development of the vegetable and flower seed industry. *Potatoes*: fertilizer, variety, and irrigation trials; the use of dried rose ends and excised eyes as seed; methods for breaking seed dormancy. *Tobacco*: the improvement of yellow-leaf tobacco. *Grapes*: improvements in raisin making and wine production, the conversion of vineyards to better varieties, manurial trials. *Olives*: the study of local and imported varieties, tests of local wild olive strains as rootstocks, propagation from cuttings, the study of flowering, nutrition studies using leaf analysis technique, attempts to control the olive fly (*Dacus oleae*). *Carobs*: investigations into methods for controlling the carob rat. *Citrus*: investigations into maturation and vitamin C content of fruit, trace element deficiencies, rust mite (*Phyllocoptes oleivorus*) and the cottony cushion scale (*Icerya purchasi*). *Deciduous fruit*: variety trials with tree and small fruits, trials of apple, plum and quince rootstocks, trace-element deficiency trials using a leaf injection technique, experiments in fruit drying. *Sericulture*: trials of mulberry varieties under different systems of cultivation.

2602. GEORGIA.

Sixtieth Annual Report of Georgia Experimental Station, 1947-48, Experiment, pp. 135.

Horticulture (pp. 80-99). The following are reported: spraying experiments for the control of plum curculio; the breeding, pruning and training of muscadine grapes; variety and training tests with dewberry, blackberry and raspberry; the degree of cold injury to fig varieties; vegetable, sweet corn, tomato, and sweet potato variety trials.

2603. GOLD COAST COLONY.

Report of the Department of Agriculture, Gold Coast Colony, for the year 1947-48, Accra, pp. 14, 1s.

Cacao: The most urgent problems continued to be the need for bringing swollen shoot disease under control and rehabilitating the industry. Progress was disappointing, mainly because of the active resistance of growers to the destruction of diseased trees. Policy is restated. Up to date over 1,173,000 acres of land had been surveyed and approximately 2,894,000 diseased trees cut. It is estimated that 46 million diseased trees remained. **Coconut:** A wilt disease, known for some time, became more serious in one area. **Limes:** It has been shown that the serious "die-back" of this crop is almost certainly caused by a virus. The position had been reached where trees, on their own roots, were dying at a rate that foreshadowed the extinction of the lime export industry in 7 to 8 years. The only hopeful remedy is to replace seedlings with plants budded on rough lemon rootstocks. Large numbers of budded plants were being produced.

2604. HAWAII.

Biennial report of the Hawaii Agricultural Experiment Station for 1946-48, Honolulu, 1948, pp. 171, illus.

Horticulture. Papaws: Certain F_1 hybrids between inbred lines and commercial strains appear particularly promising in yield, vigour, and quality. Macadamia nuts: Five outstanding selections resulting from work begun in 1936 have been named: Pahau, Keauhou, Nuuanu, Kohala, and Kakea. Vegetables: Work continued on the improvement of vegetable varieties suited to tropical upland and lowland conditions. Improved types of sweet potatoes, green beans, lettuce, tomatoes and peppers are being grown on large acreages. **Entomology.** The Oriental fruit fly, *Dacus dorsalis*, new to Hawaii, was discovered in May, 1946, and has since increased at an alarming rate. Over 85 fruits have been found to be attacked, including mango, papaw, avocado, banana, fig, pineapple and some citrus. Control by insecticides appears promising. New research is being undertaken on its ecology and biological control. Effective control of the me'on fly, *Dacus cucurbitae*, has been secured with DDT, in some cases applied to maize grown as a barrier around the crop to be protected. Parathion and Methoxychlor showed promise of controlling the same pest and had a faster knockout than DDT. An attempt to eradicate papaw ringspot, a virus disease, by burning infected plants and spraying the remainder to kill the aphid vector, resulted in restricting the disease to about 1% of the plants. Mangoes sprayed regularly with DDT and sulphur to control thrips and red spider developed infestations of red wax scale. Six months after DDT spraying had stopped parasitism of the scale reached 35%. **Plant physiology.** A study of crop logs from irrigated sugar-cane showed that high sugar content in the cane was characterized by a final moisture index (content of young leaf sheath) of 73-74%, a figure which must be achieved gradually. A crop log method to determine when to start ripening cane was subsequently developed and is now used successfully on about 50,000 acres. Studies in floral development indicate that it may be possible to bring about reversion to the vegetative state in sugar-canes which have started to arrow. The method for controlling weeds by 2,4-D, before they appear as seedlings is being rapidly adopted by the sugar industry and may mean

the survival of certain marginal plantations. In a study of unfruitfulness in the litchi, hormone spray treatments using sodium naphthalene acetate (SNA) have given promising results which may lead to the production of regular crops. [Fuller abstracts from various sections of this long and comprehensive report appear elsewhere in this number of *H.A.* under their appropriate heads.]

2605. LA HULPE.

Rapport de la Station Provinciale des Recherches Scientifiques de Viticulture No. 3, Essais pratiqués en 1948. (Report of La Hulpe [Belgium] Viticultural Research Station on 1948 trials), 1949, pp. 23.

The effects of applying a large number of growth substances in aerosol and ordinary spray form and at different concentrations to the open flowers of Cannon Hall and Leopold III tablegrape varieties were observed. The aim, which was to ensure compact bunches of regular grapes in these varieties which are prone to non-setting, was largely achieved, the aerosol treatment proving generally, though not always, superior. Another trial concerned the treatment of cuttings with growth substances. Results of the various treatments in the above two trials are tabulated, but the numerical data on which they are based are omitted. Other work is recorded on the treatment of mites, *Eotetranychus telarius*, with azobenzene in aerosol form. All the experiments are being continued.

2606. JOHN INNES.

Thirty-ninth Annual Report John Innes Horticultural Institution 1948, Merton and Hertford, 1949, pp. 33.

The report opens with an aerial photograph of the institution's new home at Bayfordbury and closes with a map showing how to reach it. *Director's report.* Five acres of the heavier land at Bayfordbury has been set aside for a collection of rose species. It is noted that criticisms of the present Russian attitude to plant genetics will be found in *Discovery*, February, 1949, and in later numbers of *Heredity* and *The Countryman*. **Pomology Dept.** Work is noted on:—Genetics of pears, breeding of raspberries, potato breeding, tomato varieties, breeding of beans, *Nicotiana rustica* (for nicotine), and *Digitalis purpurea* (for digitalin). **Cytology Dept.** A survey has been undertaken of the enormous number of cultivated clones of garden daffodils. A cytological and experimental study is being devoted to earthworms. **Garden Dept.** The effects of artificial illumination of tomato seedlings in the sunny spring of 1948 were no less noticeable than in the dull spring of 1947. Standardization of loam in the stack has now been proved to be of great importance for compost. The notes given here supplement the general description, appearing in other publications of the Institution, of methods necessary to achieve this. In composting sterilized loam there would appear to be no point in deferring mixing till the loam cools after sterilizing. Recommendations based on most recent experience are given for raising tomato and lettuce plants. The use of soil blocks in place of clay pots for the growth of cauliflower and tomatoes is submitted to criticism, which is on the whole favourable.

2607. LETHBRIDGE.

Progress Report Dominion Experimental Station, Lethbridge, Alta, 1937-46, 1949, pp. 91.

Horticulture (pp. 34-41). Breeding: In the search for a suitable canning tomato for southern Alberta early maturing bush types have been found the most promising. Three promising tomato selections of the cross Farthest North × Polar Circle are described. Brief reference is made to sweet corn and vegetable breeding. Variety trials: Vegetable and small fruit varieties are recommended, based on trials over 10 years. Cultural experiments: Ammoniated iron citrate appears to control strawberry chlorosis without injuring the foliage. Chlorosis of fruit trees was best cured by spraying with "an iron solution" but direct injection also gave excellent results. Fire-blight, a bacterial disease, has caused very severe damage to apples and crabs. Seven apple varieties, 3 apple × crab hybrids, and 4 crabs are listed which show almost complete resistance to it. Fertilizer experiments with tomatoes, celery, and potatoes are reported. *Weed control* (pp. 18-23). Experiments are reported on: controlling field bind-weed, Russian knapweed, and Russian thistle by cultural operations; chemical control, using sodium chlorate, carbon disulphide and 2,4-D; the moisture content of soil under weeds compared with that of clean land.

2608. MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Annual Report of Massachusetts Agricultural Experiment Station for year ending June 1948, Amherst, 1949, pp. 80, being Bull. 449.

Pomology: The reactions of apple varieties to chemical thinning by different compounds at different dates of application are discussed. Liquid dinitro materials are no longer considered suitable. In raspberries winter hardiness was found to be associated with a relatively long period of dormancy. During the winter 1947/48 a raspberry plot mulched with hay or straw suffered greater frost injury than another plot cultivated with a cover crop. The difference in susceptibility was not related to N supply. Other work in progress concerns weed control round 1-year-old apple trees—ammonium sulphamate at 6 lb. per gal. caused injury—and in strawberries and blueberries using 2,4-D; nutrition of blueberry, especially in relation to soil reaction; and top and soft fruit variety trials. *Horticulture*: Work on the eradication of weeds in nurseries continued. In gladiolus hand weeding was necessary after the plants were up. *Rhododendron roseum elegans* leaf bud cuttings rooted excellently (87%) when taken from firm current wood, treated with a proprietary growth substance dust and placed in horticultural peat moss. *Olericulture*: Asparagus selection and the breeding of other vegetables is reported. Studies designed to find selective herbicides for set onions have given "most promising" results. Chickweed and annual grasses were successfully controlled in spinach and lettuce. Effective chemical weed control was further carried out in sweet corn and beans. *Floriculture*: Glasshouse red spider was controlled by specified amounts of sodium selenate without damage to the plants. A new

plastic material proved to be a good insulator of flower shipping boxes against the effects of heat and frost. *Entomology*: Insect pests controlled include onion thrips, cabbage maggot, squash vine borer, glasshouse red spider on roses, plum curculio in apples, celery plant bug. *Agronomy*: With tobacco nitrogen applications after such crops as corn, clovers and grasses, which are high in lignin, improved quality and yields, especially if ploughed in early in the autumn. Failures in tobacco seed beds were shown not to be due to chloropicrin in the soil residual from previous sterilization, but to the effect of fertilizers applied not long enough before seeding. With potatoes the banded form of fertilizer application gave 51% higher yields than broadcasting. A new model of a potato vine lifter is illustrated, which picks up the vines between the rows to prevent injury by spraying equipment. Winter cover crops for onion and potato, orchard grasses and onion breeding are among other topics discussed. *Botany*: The application of fungicides to soils in a carrier of commercial fertilizer was beneficial in the case of damping off of cabbage and onion smut and clubroot of cabbage. The effect of soil moisture on clubroot control is under investigation. Tobacco frencing was induced by nitrogen deficiency and by high soil temperatures. The latter type of frencing is caused by a deficiency in available iron. Black rot of squash (*Mycosphaerella citrullina*) in storage was controlled by protectant sprays in the field and fungicidal dips at harvest. *The Cranberry Station* at East Wareham reports on pest and bogweed control.

2609. MELITA.

Progress Report Dominion Reclamation Station, Melita, Manitoba, 1936-47, pp. 31 [received 1949].

This station was established in 1935, primarily to study problems of drought and soil drift. Most of the crops mentioned are not horticultural. *Weed control*: Particular attention has been given to the use of herbicides (sodium chlorate, and 2,4-D) against leafy spurge. Other experiments reported concern the use of crested wheat grass to control the same weed, tillage at harvest to control annual weeds, and methods for eradicating couch grass.

2610. THE NATIONAL CACTUS AND SUCCULENT SOCIETY.

The National Cactus and Succulent Journal, Leeds, 1949, Vol. 4, No. 2, pp. 23-44. membership subscription including *News Letters* £1 per annum.

We would draw the attention of those interested in succulents to this quarterly journal. The current number contains short, well-illustrated articles of a descriptive and instructional nature.

2611. NATIONAL INSTITUTE OF AGRICULTURAL BOTANY.

Seed Growers' Leaflets and Seed Notes, 1948 and 1949, each 2 to 4 pages in length, obtainable from Executive Office, Seed Production Cttee, N.I.A.B., Huntingdon Road, Cambridge.

The following valuable, practical leaflets, first published or revised in 1948 and 1949, have recently come to our notice. They include recommendations based on

current commercial practice, varying in length from 2 to 4 pages.

- Leaflet No. 1. Growing brussels sprouts, cabbage, savoy, and heading broccoli for seed.
- " 2. Growing kale, sprouting broccoli and rape for seed.
- " 3. Growing swede and turnip for seed.
- " 4. Growing runner beans, french beans and broad beans for seed.
- " 5. Growing peas for seed.
- " 6. Growing carrots for seed.
- " 7. Growing parsnip, celery and parsley for seed.
- " 8. Growing mangold, sugar beet and garden beet for seed.
- " 9. Growing spinach, cress and radish.
- " 10. Growing onion and leek for seed.
- " 11. Growing lettuce for seed.

- Seed Notes No. 25. (1) Seed disinfection of linseed.
(2) Cereal seed crop inspection schemes: 1948.
(3) Local strains of herbage plants.
(4) Harrison's Glory pea seed approval scheme.
(5) Fumigation of onion seed for control of stem eelworm.
- " 26. (1) Sowing and establishment of herbage seed crops.
(2) Application for stock seed of Aberystwyth strains received to date (7 March, 1949).
(3) Average yields of vegetable seed crops.
(4) Mangold colour zoning scheme in Bedfordshire.
(5) Revised seed growers' leaflets.
- " 27. (1) Cabbage aphid (*Brevicoryne brassicae*).
(2) Destruction of bolting brassica plants on headlands and in gardens.
(3) Zoning scheme in Huntingdonshire and Soke of Peterborough.
(4) Zoning scheme in Northamptonshire.
(5) Lettuce seed fly (*Chortophila gnava*).

2612. NATIONAL NORTHWESTERN COLLEGE OF AGRICULTURE, CHINA.

Annual Report of the National Northwestern College of Agriculture, August, 1946, pp. 74, Publ. Coll. Press, Nat. N.W. Coll. Agric., Wukung, Shensi, China [received 1949].

Horticulture (pp. 17-18). Special attention has been paid for years past to the introduction of fruit and vegetable varieties for trial. Collections of apple, pear, grape, peach, apricot, and pomegranate varieties have been established and trials laid down, including an apple orchard of 3,000 bearing trees and a peach orchard of about 2,000 trees. There is a list of 21 horticultural studies past and present (pp. 30-1). Abstracts are given of the following papers (pp. 49-58): A list of ornamental shrubs and trees cultivated

in Wunkung, Shensi, by F. T. Wang, The growth and fruit bud differentiation of apples (in press), by Shih-Hsin Chen and Chung-Shu Lu, and A survey on persimmon varieties in Kwan-chung, Shensi, by F. C. Yuan.

2613. NIGERIA.

Sixth Annual Report of the Oil Palm Research Station, Nigeria, 1944-45 and 1945-46, pp. 7, mimeo [received 1949].
Seventh Annual Report of the Oil Palm Research Station, Nigeria, 1946-47, pp. 110 [received 1949].

Sixth report: This is in the nature of a brief progress report, largely confined to administrative matters. Seventh report: This is a very full printed report from which the following items have been selected. Agronomy: The problem of how to maintain yields in mature oil palm plantations received much attention. The problem appears to be essentially one of soil fertility, often associated with disease, possibly deficiency disease. The routine now adopted in establishing palms is as follows: seed, accumulated as produced, is sown in germinators (raised trays) in July. Most germinations occur 2½ to 5½ months later. The seedlings are left in the trays until the April rains, when they are transplanted to nursery beds, usually shaded, where they remain for 15 months, after which they are transplanted to their final places in the field. From pollination to ripe seed takes about 6 months, from sowing to field planting about 2 years, and from planting to the first worthwhile crop about 5 years. Thus in producing a certain cross about eight years elapse before the first harvestable crop is obtained from the progeny; but allowing for various difficulties 12 years should be reckoned for an oil palm generation. The plantation technique at present adopted is described. No burning is done. Cover crops in palm plantations have been given up for the time being in favour of spontaneous, perennial weeds. Cultural experiments: Those reported include investigations on: establishment of palms, burning *versus* non-burning, soil covers, spacing, intercropping, grazing, manures, deep planting, mulching, holing, etc. An experiment is reported on replanting, an operation that appears to be essential on oil palm plantations. The need for studying the wild oil palm is stressed and some records from natural groves quoted. Various experiments from out-stations are reported. *Breeding and selection*: Breeding has been in abeyance since 1945 and will remain so until the staff position improves. A brief review is given of progress already made. The Congo theory of inheritance in the oil palm is discussed. Work concerned with selection areas, progeny trials seed for distribution, the Deli palm, and miscellaneous investigations are reported. A living collection of palms of particular interest is being established. *Chemistry*: The programme includes studies of soils and oils. The work of previous years is summarized. *Pathology*: A brief summary is given of the disease situation. Without a pathologist, or a laboratory, little more than casual observation has been possible.

2614. NORTHWEST BULB GROWERS ASSOCIATION.

Proceedings of the 1949 Bulb Growers Short Course, Puyallup, Wash., March 1 and 2, 1949, 1 and 2 March, 1949, pp. 78, \$1.00.

The purpose of this second short course was the same as that of the first course in 1948, namely to give iris, tulip and narcissus growers the latest information available on their problems. It was sponsored by the Western Washington Experiment Station at Puyallup. The papers given are eminently practical and will interest bulb growers elsewhere. They concern the following subjects:—Experiments on cutting and shipping flowers, Botrytis spotting of flowers, virus diseases of daffodils, iris nematodes and their control, sanitation *versus* nematodes in field and shed, results of 1948/49 iris forcing experiments, possibilities for chemical weed control, a new fungicide for basal rot control, fertilizers and their effect on basal rot in the Eastern U.S. and the problem of storage rots. [See also abstracts 2364, 2369 and 2370.]

2615. NYASALAND PROTECTORATE.

Report of the Department of Agriculture for 1946, Pt. II—Experimental work, Zomba, pp. 12 [received 1949].

The following work is briefly reported. *Tung*: selections of promising mother trees, vegetative propagation as buddings on seedling rootstocks, tests of buddings *versus* seedlings, variation in flowering and fruiting characters between clones, cultural and manurial experiments, root studies. *Tea*: down pruning old tea, tipping levels of China jat and influence of pruning methods on tipping, treatment of young tea bushes, spacing, different methods of pruning and extending the pruning cycle, vegetative propagation.

2616. PENNSYLVANIA STATE HORTICULTURAL ASSOCIATION.

Proceedings of 90th Annual Meeting of the Pennsylvania State Horticultural Association 1949, in St. hort. Ass. Pa News, 1949, 26: 1: 1-87.

The undermentioned articles are of interest to research workers: Problems confronting Virginia fruit growers in the control of diseases affecting fruit crops, pp. 21-4; A brief survey of the apple industry of Pennsylvania, pp. 25-33; The role of minor elements in efficient fruit production, pp. 41-50; Fruit insects and their control in Maryland orchards, pp. 50-7; Nitrogen fertilization of the apple with leaf sprays of urea, pp. 57-61; and Newer developments in application [spraying] equipment, pp. 62-7.

2617. PYRETHRUM BOARD OF KENYA.

Annual Reports of the Agricultural Officer, Pyrethrum Services 1947 and 1948, pp. 7 and 7, mimeo.

Experimental work: Brief reference is made to 30 field trials of modern type designed to test: varieties, cultivation methods, manures, rotations, planting distances, seedlings *versus* splits, transplanting machinery, herbicides, etc. Repeated trials of the high toxic strain 14×24 confirm that it is unsuitable for planting below 7,500 ft. a.s.l. Several selections with more than 2% pyrethrins were under trial. Results from spacing trials indicate that the optimum density of pyrethrum plants per acre is 20 to 25 thousand. In trials of rapid multiplication methods it was shown that a single pyrethrum plant will give 120-250 cuttings for propagation (survival rate 80-90%). The results from trials with imported transplanting machines is summarized and one machine recommended. *Ramularia*

bud disease occurred in almost all pyrethrum areas in 1947-48 but did not cause much loss, except in a few instances. Studies of possible relationships between climate and the occurrence of the disease were continued. The H.T. strain 14×24 was significantly more resistant to *Ramularia* than ordinary pyrethrum. The chances of breeding varieties which are resistant to the disease are promising. Trials of various growth substance herbicides in pyrethrum fields were disappointing. One herbicide, DCPA, caused a marked decrease in the pyrethrin content of the flowers. In small-scale germination tests pyrethrum seed sprouted best at 15° C., indicating the necessity for keeping seed-beds cool by mulching.

2618. QUEENSLAND.

Annual Report of the Department of Agriculture and Stock, Queensland, for 1947-48, pp. 92.

Horticulture branch (pp. 24-8). Vegetables and fruit: High yields, up to 1,000 $\frac{1}{2}$ -bushel cases per acre, are reported from tomato trials. The varieties Valiant, Sioux, Rutgers, Grosse Lisse, and Rutgers×Marvel hybrid have given excellent results over a period of years in the Stanhope district. Breeding and selection work with papaws is reported. The papaw Bettina has shown considerable promise. Interest is being shown in the thin-skinned type of Queensland nut [Macadamia] which gives 60% of edible material. There are indications that the banana variety Mons Marie is less susceptible to bunchy top disease than the Cavendish. The Casanave Cordon method of pruning grape vines continues to give increased yields, with some varieties, in preliminary experiments. Tests of hormones in preventing fruit drop of citrus were inconclusive. Storage and transport: Work is reported on, canning of papaws and pineapples, the carrying qualities of tomato varieties, maturity standards for apples, the packing of apples and pineapples, black heart of pineapples, citrus colouring, banana ripening, etc. In trials of skin coatings for stored apples an alcoholic solution of castor oil gave very satisfactory results. *Science branch* (pp. 39-47). Work is reported on the diseases and/or pests of bananas, citrus, cucumbers, deciduous tree fruits, grapes, passion fruit, papaws, pineapples, strawberries, and tomatoes.

2619. LAWES AGRICULTURAL TRUST [ROTHAMSTED].

Report of Rothamsted Experimental Station for 1947, Harpenden, pp. 131, 3s.

Brief accounts of work on the following subjects of horticultural interest are included: The effects of darkness on susceptibility to virus infection in bean and tobacco and of fertilizers on susceptibility to tobacco mosaic; the effect of "hormone type" and DNOC herbicides on honey bees; tomato moth (*Diatraea oleracea*), black chrysanthemum aphid, and diamond-back moth are among the insect pests, the control of which was studied. The report concludes with a 6-page "Review of work on potato virus diseases".

2620. ROYAL SOCIETY.

A list of periodicals and bulletins containing abstracts published in Great Britain.

The Royal Society, London, 1949, pp. 62.

This valuable list, which has been prepared under the supervision of the Abstracting Services Consultative Committee, is divided into four main parts: (1) lists of periodicals publishing abstracts in various sciences (127 in all), (2) an alphabetical list of these with explanatory notes on each, (3) an index to the names of institutions, societies and other publishers, and (4) an appendix giving a partial list of journals containing abstracts published in Australia and New Zealand. No abstracting publications are issued by Canada, Central Africa, Rhodesia or South Africa. The Indian list is not yet available. The number of periodicals in Great Britain publishing abstracts relating to agriculture, botany, food and nutrition amounts to twenty-six. [One slip is worth notice, viz. it is stated on p. 28 that *Horticultural Abstracts* consists of abstracts only. In fact book reviews are also included].

2621. SAANICHTON.

Progress Report Dominion Experimental Station, Saanichton, B.C., 1937-46, pp. 68 [received 1949].

The problems studied are those of the small farmer and fruitgrower. Most of the land in the district is, or has been, heavily wooded. Nearly 100 apple varieties have been under trial since 1914. Of these the earliest variety is Close (as early as 4 July). Yellow Transparent is about a week later. Melba (Red), a high quality apple, ripens in early August. Gravenstein has been a standard for quality. The newer Red Gravenstein has colour as well. McIntosh, although not strongly recommended, is a good late autumn kind where it has sufficient moisture. Blenheim, a heavy yielder of high quality, stores until early March. Golden Grimes and Wagener, two good winter apples, usually keep till early April. Yellow Newtown is the best late variety for use in spring. Extensive rootstock trials have been made with several varieties on numerous East Malling stocks. No detailed report on these is yet available. Pollination studies with 14 apple varieties show that self-compatibility exists in most of them, but only in a few instances was a satisfactory fruit set obtained from self-pollination. Breeding for earliness is in progress. Variety recommendations are also made for cherries, pears, plums, quinces and peaches. Cherry pollination studies are reported and a list is given of good pollinators. In investigations on cherry splitting, none of the chemicals tested prevented the trouble. Pollination studies on pears, in progress since 1929, have shown self-incompatibility to be very prevalent among pear varieties. A list of pollinators is given. In a trial of frame-working *versus* top-working total yield to date from the former was double that obtained from top-worked trees. A summary of valuable pollination studies on plums is given. *Filbert*. Yield trials and pollination studies are recorded. *Walnut*. In yield trials no advantage resulted from planting trees in "blown" (with explosives) holes. Yields from a trial (established 1917) of grafted and seedling varieties have been disappointing. *Brambles*. The merits of different kinds is discussed. Breeding is in progress. *Grapes*. Of the varieties, planted 20 years ago, Campbell's Early is still best. A list is given of American varieties and *vinifera* hybrids now being grown. *Strawberry*. Forty varieties, North

American and English, are under trial. British Sovereign is still the chief commercial variety on the Island. Breeding work is summarized. *Bulbs*. Ten pages are given to an account of work on problems related to bulb production, greenhouse flowering, and shipping. *Vegetables*. The improvement of seed-stocks and some seed production methods are described. Variety trials are reported. *Plant nutrition*. The conclusions drawn from soilless (sand) culture experiments with carnations are summarized. The method offers distinct possibilities. Paper mulch experiments indicated that physical changes in the mulched soil may be the most important factors responsible for the increased growth observed in such crops as melons and cantaloupes when mulched with paper.

2622. SCHOFIELD, J. L. [VOELKENRODE].

Annual Report of the Voelkenrode Centre for Agricultural Research and Education for 1948, and of the Scientific Adviser, Food, Agriculture and Forestry (British) for 1948, 1949, pp. 12, mimeo.

In March, 1948, the "Main Area" at Voelkenrode, formerly a research station of the German Air Force covering more than 1,250 acres, was handed over to the Food and Agriculture Division of B.O.A.R. to be developed for "Peaceful Research and Education in Agriculture". The centre is to operate as a Bizonal Organization, its immediate object being "Agricultural research and other scientific work related thereto and international co-operation in this respect". The long-term object is "the development of a Pan-European agricultural research centre and eventually an international agricultural research centre". None of the 7 institutes established so far is concerned directly with horticulture. Brief mention is made also of the Max-Planck-Inst. f. Züchtungsforschung, Director Professor Dr. W. Rudorf [location not stated], the programme of which includes breeding work on virus-, blight- and Colorado beetle-resistant potatoes.

2623. TANGANYIKA INDUSTRIAL COMMITTEE.

Annual Report of the Tanganyika Industrial Committee, 1947.

Fifth Annual Report, East African Industrial Research Board, 1947, 1949, pp. 20-5.

Papain: Laboratory experiments have shown that at least two factors can adversely influence colour: (1) the temperature of drying: the higher the temperature of drying in general the darker the colour, (2) the time which elapses between tapping and drying. It has been shown that there are a number of oxidases and peroxidases present in the fresh juice, and the action of these may adversely affect the colour of dried papain when the latex is allowed to stand in air. There may be other factors involved. Experiments have also been carried out on the drying of papain relative to its activity. Experiments in closed ovens or cabinets at various temperatures from 37° to 100° C. (99° to 212° F.) show that the best results are obtained at the lowest temperature tried. Drying in a current of air increases the tendency to discolour and gives a lower activity. Sulphur dioxide by its destructive action on the oxidases and peroxidases removes the main source of deterioration. If papaw latex is treated with sulphur dioxide and subsequently dried either in vacuum at 55° C., or in an incubator at 38° C., the resultant

product is superior in colour, smell and activity to a similar sample of untreated juice dried under the same conditions. Too much SO_2 has a deleterious effect on the papain, and too little will not destroy the oxidases.

2624. TEA RESEARCH INSTITUTE OF CEYLON.

Annual Report of the Tea Research Institute of Ceylon for 1947, being *Bull.* 29, pp. 60 [received 1949].

The following abstracts are taken from the director's report, which is followed by the fuller reports of the research divisions. Attention is focused mainly on blister blight [see *H.A.*, 18: 2315] and tea manufacture. Following reports of heavy damage by blister blight in South India, the Ceylon industry looked forward to 1947 with considerable anxiety. Fortunately, the blight, introduced in October, 1946, was checked by the ensuing dry weather, thus giving time for protective measures to be devised and made known. These measures took the form of (1) dry weather pruning, so that the recovery of the bushes occurs when the climate is unfavourable for the disease, and (2) lighter pruning. Fields pruned in the dry weather generally came back well from pruning without serious damage from blister blight. Although there is no justification for complacency, it is now thought that the disease is unlikely to threaten the existence of the tea industry of Ceylon. Two further measures were suggested to minimize attacks and reduce loss of crop: the reduction of heavy shade, and plucking at shorter intervals. Although the spores of the disease are rapidly destroyed by sprays of the cuprous oxide type, spraying is not practical under normal circumstances with tea in plucking. Spraying, however, is useful in nurseries, in regions subject to mist over long periods, and in areas recovering from pruning when conditions favour infection. It has been confirmed that certain bushes show high resistance to the disease and careful search would probably reveal many more. The vegetative propagation of these should provide large quantities of resistant material, invaluable as a long term protective measure. Fortunately some of the high yielding and high quality clones selected by the institute before the coming of blister blight show resistance to the disease. Further experience supports the view that the disease is likely to be of little importance at elevations below about 2,000 feet. At such elevations the temperature is probably the controlling factor. Tea manufacture: Work is reported on epicyclic rolling and high pressure rolling using unwithered leaf.

2625. TRINIDAD AND TOBAGO.

Administration Report of Director of Agriculture, Trinidad and Tobago, 1947, 1948, pp. 19, 60 cents.

Cacao: The propagation of clones resistant to witches' broom proceeded rapidly. Survey has shown that virus disease is confined to the north-west of the Island. Lateral spread appears to be very slow and mainly by contact, but occasionally jumps of over a mile occur. Investigations on fermentations to find a satisfactory method for dealing with a few pods were continued. Experiments in building up cacao soils by mulches have fallen short of expectations. Studies of root distribution have shown that in cacao there is a well-marked plate of roots near the surface, a very small tap-root of about 18 in. usually ending in a

hemispherical cup up to 2 in. in diameter, and few, if any, other roots below the surface plate. *Sugar-cane*: The variety B.34104 accounted for about half of the crop. The use of cover-crops is increasing. This practice suppresses weeds but no increase in cane yield can be claimed from it. On one estate control of frog hopper (*Tomaspis saccharina*) was obtained by using DDT. The method used is described. Other estates reported encouraging results with gammexane used as a drift-dust against the adult frog hopper. There are indications that it might be applied with advantage to the soil to check nymphal emergence. A recent survey showed that 4.38% of cane joints were bored by *Diatraea* spp. A small outbreak of Pokkah Boeng was recorded, the first report of this disease in Trinidad. *Citrus*: Trial has shown that while an excellent response may be obtained from ammonium sulphate, certain undesirable features, such as increased dieback, may be produced. Dieback can be largely, or entirely, prevented by using fertilizers containing magnesium, in conjunction with zinc and manganese sprays. The dying out of limes continues. Encouraging results have been obtained from investigations into the malady. *Coconuts*: A tree selection scheme has been started. *Tomato*: It is hoped to develop a satisfactory tomato for the wet season by breeding from Wonder of Italy, a small, pear-shaped variety which tolerates wet weather.

2626. UNESCO.

List of scientific papers published in the Middle-East.

Publ. Sci. Coop. Office, Middle-East, Cairo, 3, May, 1949, pp. 58.

Includes French or English titles of numerous papers in Turkish and Arabic on agricultural subjects.

2627. UNION OF SOUTH AFRICA.

Report of the Department of Agriculture for the year ended 31 August, 1948.

Fng S. Afr., 1949, 24: 39-170, illus.

The report of the Secretary for Agriculture occupies pp. 39-64, the rest of the publication being devoted to 16 divisional reports, including those on: horticulture, the Western Province Fruit Research Station, chemical services, the agricultural research institutes of Pretoria and Natal, botany and plant pathology, entomology, soil conservation. [Abstracts from the first five of these reports appear under their appropriate heads in this number.]

2628. ANDERSSSEN, F. G. [UNION OF S. AFRICA, DIVISION OF HORTICULTURE].

Advancement of the fruit, flower and vegetable industries.

Fng S. Afr., 1949, 24: 114-18.

This is the 1947-48 annual report of the Division of Horticulture, Department of Agriculture, S. Africa. The following research projects, amongst others, are briefly reported. *Citrus*: Nutrition studies, water relationships, breeding and selection. Extensive work has given reasonable proof that leaf analysis of citrus trees could provide a cheap and accurate method of estimating the balance between soil supply and the plant's utilization of nutrient materials, and also show the dividing lines between deficiency, sufficiency and excess. There are approximately 300 citrus varieties

and species at the Nelspruit Research Station. It has become evident that many strains of the Navel orange are grown in the Union. *Avocado*: A new orchard at Nelspruit has some 50 varieties under trial on West Indian, Guatemalan, and Mexican stocks. *Mango*: Work continued on vegetative propagation—a difficult problem. A new variety orchard was started. *Papaw*: The selection and breeding programme for improving fruit quality, etc., made satisfactory progress. A new orchard of 286 selections and crosses was established. Work on vegetative propagation was completed: results will be published shortly. *Pineapple*: Different fertilizer treatments have resulted in considerable differences in growth and cropping. Leaf analysis diagnoses have shown the importance of trace elements, particularly manganese, in some pineries. A superior selection of pineapple has been distributed for trial. Many crosses between Queen and Smooth Cayenne have been made and some very promising seedlings selected from them. *Deciduous fruit*: Apple rootstock investigations with Rome Beauty on Sweet Apple, Merton 793, and Northern Spy stocks continued. *Vegetables*: Work on the following is reported: variety tests, nutrition and growth problems, planting methods for onions, breeding and selection, including the production of hybrid seed. *Viticulture*: New trials with sultanias are being laid down at Upington to study nutrition, irrigation, pruning, trellising, rootstocks, and drying. *Floriculture*: The building up of the seed production industry is making good progress.

2629. SAUNDERS, A. R. [NATAL AGRICULTURAL RESEARCH INSTITUTE].

Farming problems in Natal.

Fmg S. Afr., 1949, 24: 155-6.

This is the 1947-48 report of the Natal Agricultural Research Institute, a new division of the Department of Agriculture, S. Africa. *Horticulture*: Reference is made to the planting of a variety orchard for testing over 100 fruit kinds and varieties.

2630. DAVEL, H. B. [AGRICULTURAL RESEARCH INSTITUTE, PRETORIA].

Research in agriculture.

Fmg S. Afr., 1949, 24: 98-104.

This, the annual report of the Agricultural Research Institute, Pretoria, for 1947-48, contains references to the following investigations of horticultural interest. (1) *"The Sour-orange Rootstock Problem"*.—After several years of intensive research, it has finally been established that the so-called "incompatibility reactions" exhibited by certain stock-scion combinations of citrus in South Africa (the classical example of which is the failure of the sweet-orange scion on the sour-orange rootstock), is caused by a virus. This result brings the long-standing incompatibility reactions experienced in South Africa into alignment with the problems of "Tristeza" and "Quick decline" of South America and California respectively. This study is being continued. (2) *Nucellar Embryony in Citrus*.—Since most virus diseases are generally not transmitted through seed, use is being made of the incidence of "nucellar embryony", to purify existing clones of possible virus infection. (3) *Grapefruit-tree Decline ("Stem Pitting")*.—It has been established that the disease is transmissible by budding and hence

is probably a virus. (4) *Studies on "Bolting" in Onions*.—At transplanting time seedlings were divided into four lots and subjected to the following treatments: (i) unpruned, (ii) both tops and roots cut, (iii) roots only cut, (iv) tops only cut. The percentage of bolting ranged from 40% to 50% in treatments i, iii and iv, whereas it was reduced to 30% in treatment ii.

2631. WATTLE RESEARCH INSTITUTE.

Report for 1948 of the Wattle Research Institute, Pietermaritzburg, 1949, pp. 26.

Although the work of this new research institute will largely concern the forester, the execution of certain parts of the programme will be no less interesting to horticulturists. They concern root/shoot ratio studies, vegetative propagation technique, frost control experiments, the use of colchicine, twin seedling chromosome number and weed control. The Committee of control consists of 3 representatives of the South African Wattle Growers' Union, 2 of the Natal University College, 1 of the Union Government Department of Forestry, the Director and an Honorary Secretary. The Bureau wishes the Institute and its Director a long life and a useful one.

2632. NEL, R. I. [WESTERN PROVINCE FRUIT RESEARCH STATION].

Strengthening the fruit industry.

Fmg S. Afr., 1949, 24: 146-53.

This article constitutes the annual report of the Western Province Fruit Research Station, Department of Agriculture, South Africa. The following research projects, amongst others, are reported. *Agricultural meteorology*: Studies of the influence of weather on the flowering and setting of different fruits continued. Preliminary studies of apricots show that winter temperatures do not affect yields to the same extent as in other fruits. *Plant breeding*: Observations on 1,000 grape hybrids continued. Peach varieties resistant to delayed foliation were imported mainly for breeding purposes. A tetraploid guava seedling with promising breeding potentialities was bred. Triploid guavas can now be produced on a large scale with the possibility of obtaining types with few seeds. Some apple hybrids cropped for the first time. *Pomology*: Spraying experiments to control delayed foliation in prunes, pears, and apples yielded interesting results and showed that the addition of dinitro-cresol (DNC) improves the effect of winter oil sprays considerably. Late pruning of peaches to control delayed foliation again gave good results. *Varieties*: The Fuerte avocado again yielded the best crop. Nellis appeared to be the best pecan. Long-term rootstock trials [unspecified] continued. The pollination requirements of some apple and pear varieties were tested. *Grapes*: Pruning, topping, thinning, trellising and other experiments are reported. *Mineral deficiencies*: Experiments are reported on manganese deficiency in peach, avocado, and Boysenberry. *Soils*: Abnormalities in prunes, apricots, peaches and grapes at Tulbagh were traced to an excess of manganese in the soil. Remedial measures are being sought. *Soil moisture studies*: It was found that creasing, a serious problem in orange production in the Citrusdal area, was evidently due to abnormal water relations, influenced in some cases by heavy applications of nitrogen. *Other investigations*: Brief reference is made to work on diseases of deciduous

fruits, insect pests of orchards and vineyards, packing and storing fruit, fruit and vegetable preservation, low temperature research with oranges and vegetables.

2633. SECRETARY OF AGRICULTURE, U.S.A.

Report of the Secretary of Agriculture, 1948, U.S. Govt. Printing Office, Washington, 1949, pp. 170, 50 cents.

The economic survey ranging over many branches of agriculture includes a chapter on fruits and vegetables. The hope is expressed that further developments in the processing industry, which already absorbs about one-third of the total citrus output, will relieve the anticipated over-production. Citrus production has virtually doubled every 10 years for the past 4 decades and is now equal to three-quarters of the non-citrus fruit production. Studies with Uraform, a slow-acting nitrogen fertilizer containing urea and formaldehyde, suggest that its application at planting time would save additional nitrogen manuring in potatoes and tobacco. In a review of scientific discoveries made at U.S. experiment stations the possible role of 2,4-D as a cheap fungicide is briefly discussed with reference to its effect on the citrus fruit rot fungus *Penicillium digitatum*.

2634. VERMONT.

Report of the College of Agriculture, University of Vermont, Burlington, July 1946-June 1948, pp. 28.

Includes short notes on the sap flow in sugar maple and on the fungicidal action of garden balsam extract.

2635. WASHINGTON STATE HORTICULTURAL ASSOCIATION.

Proceedings of the 44th Annual meeting of the Washington State Horticultural Society, 1948, pp. 296.

Sprinkling irrigation of orchards, the control of apple and pear mildew, pear blight, peach and apricot growing and the marketing of fruit were among the subjects discussed by several speakers. In three papers on insecticides the effectiveness of parathion against mites is emphasized. The chemical has proved of outstanding merit also for the control of aphids on fruit and it has given very good results against pear psylla. Successful aphid control, including that of woolly aphid, was also achieved with benzene hexachloride, which did not induce any off-flavour in apples if applied before July. DDT dust deposits from aeroplane applications and hence codling moth control in apple orchards were found to lack uniformity. A widespread disorder in young peach trees resulting from a toxic arsenic residue in old apple soil was cured by a combined zinc sulphate-high nitrogen treatment. One application of 8 lb. zinc sulphate is suggested for 3-year-old peach trees.

2636. WISCONSIN.

What's new in farm science.

Part II of 64th Annual Report of the Wisconsin Agricultural Experiment Station, 1946/47, Madison, 1948, pp. 86, illus., being *Bull.* 480.

A report, written in popular form, of the work being done at this station, including investigations on fruit, vegetable, potato and tobacco production, plant protection and weed control.

2637. WYE COLLEGE.

Report of the Department of Hop Research, Wye College, Kent, for 1948, 1949, pp. 55, 5s.

This first report from the recently extended hop research department at Wye is in two parts. The first summarizes the work of the department, the second comprises papers of general interest, abstracts of which appear elsewhere [2298, 2303]. Investigations are reported in Part I on the following subjects: *Manurial experiments*, designed to compare the value of organic and inorganic nitrogenous fertilizers for hops, resulted in a significantly lower yield from the inorganic nitrogen treatment (sulphate of ammonia) than from the organic (shoddy and castor meal). This decrease in yield has been correlated with increasing soil acidity occurring on plots fertilized with sulphate of ammonia. The mineral nutrition of hops is being studied, in particular the problem of Mg deficiency. *Cultivation trials* started in 1930 indicate that the time of year at which deep cultivation ceases has no real effect on yield. *Effect of cutting bines at picking time*. This practice may become more widespread as the use of mechanical harvesters increases. Preliminary investigations indicate that N, P and K pass from the bine to the rootstock during ripening after harvest, and that Ca accumulates in the bine. No recommendations are yet made. *Hop varieties*. (a) A selection has been made from the somewhat mixed stocks of Golding hops in cultivation with a view to raising clonal stocks of the best types. (b) The potentialities of *Humulus lupulus* var. *cordifolius* (the wild hop of Japan) are being explored for breeding purposes. Routine selection of seedlings continues. Male plants are being grouped according to observable characters and pedigree, so that they may be used to produce controlled variation. *Hop Verticillium wilt*. The exchange capacity and exchangeable cations of soil samples from healthy gardens and gardens infected with the progressive strain of *Verticillium* wilt is being investigated. *Processing of hops*. The amount of alpha resin in hops, responsible for the preservative value, gradually decreases with storage. The rate of deterioration was found to be a varietal character. Specimens of alpha resin from Northern Brewer and Brewer's Gold hops are being analysed to determine whether there is any difference in composition of the resin.

2638. WYOMING.

Fifty-eighth Annual Report of the Wyoming Agricultural Experiment Station, 1947-48, Laramie, pp. 64.

Potatoes: The virulence of ring-rot bacteria was found to be affected by the source of the inoculum, bacteria isolated from the susceptible Bliss Triumph variety being more virulent than those from the resistant Teton. Dry sterilization of burlap sacks at 240° F. for 30 minutes reduced ring-rot infection only by 50%. Promising scab-resistant varieties are on the way. *Beans*: Heating French bean seeds at 176° F. for 35 minutes with New Improved Ceresan dust and then leaving them in a closed flask at room temperature for 24 hours before planting, greatly reduced bacterial blight. It is thought that this treatment can eliminate the disease without lowering germination.

2639.

The following also have been examined:—

- a Report on the sugar experiment stations [British Guiana] for the year 1947. *Sugar Bull. Brit. Guiana Dep. Agric.* 16, 1948, pp. 55-62. Mainly a tabulated record of cane breeding.
- b *A.R. Dep. Agric. British Honduras 1947*, Belize, pp. 15.
- c *A.R. Ceylon Coconut Res. Sch.*, 1943, 1945, pp. 22, 45 cents [received 1949].
- d *A.R. Delaware St. Bd Agric. 1947-48*, Dover, pp. 49, illus.
- e *A.R. Dep. Agric., Fiji*, 1947, Suva, 1948, pp. 27.
- f *A.R. Institute of Plant Industry, Indore*, 1947-48, pp. 80.

- g *A.R. on Agriculture in Malaya for 1947*, 1949, pp. 86, 4s. 8d.
- h NATIONAL RESEARCH COUNCIL, CANADA. *The National Research Council Review, 1948*. N.R.C. No. 1713, 1948, pp. 216.
- i *A.R. Dep. Agric., Seychelles*, 1945, 1946 and 1947, pp. 11, 11 and 12 [received 1949].
- j HAYTER, C. N. *Annual Report of the Government Horticulturist [S. Rhodesia] for the year ended 31st December, 1947*. *Rhod. agric. J.*, 1949, 46: 20-5.
- k *Rep. on tea culture in Assam for 1945 (confidential)*, 1949, pp. 15.
- l U.S. DEPARTMENT OF AGRICULTURE, PRODUCTION AND MARKETING ADMINISTRATION. *Annual Report on Tobacco Statistics 1948*, Washington, 1948, pp. 71.

